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THE PRACTICAL APPLICATION OF SULPHAMEZATHINE THERAPY FOR CAECAL COCCIDIOSIS

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Although control of caecal coccidiosis caused by *Eimeria tenella* has been reasonably satisfactory in Britain ever since Horton-Smith & Taylor (1945) demonstrated the marked effect of sodium sulphamezathine when administered in the drinking water, the disease remains the principal factor limiting successful chick rearing.

Following the introduction of sulphamezathine on a commercial scale, numerous investigations have been designed with a view to improving the usage of the drug under field conditions. All such investigations have been dependent on a knowledge of the life-history of the parasite which, as the result of laboratory and field observation both in Britain and in America, is tolerably well known.

Investigation into the life-history of *E. tenella* under controlled conditions is assisted by the precise sequence in appearance of the developmental stages of the parasite. It will be remembered that the oocyst, the resting stage, gives rise within the chick to sporozoites which invade the mucous membrane of the caecum, later passing through two separate schizogonous stages and a sexual stage which culminates in the production of further oocysts. These various developmental stages follow one another at predictable time intervals. Thus the first generation schizonts are known to commence development at the 48th hour and the second generation schizonts shortly after the 72nd hour following infection. Although at any one time a chick may contain some parasites at different stages of development, the very great majority will be at the expected stage. It is doubtful whether any factor other than chemotherapy (as will be discussed later) has any significant effect on the rate of development. Resistance, following previous infection, is evinced by a very marked reduction in the number of parasites which mature, not, it appears, by a reduction in their rate of development.

Pathogenicity of E. TENELLA.—The fact that the majority of the parasites attain each developmental stage simultaneously indicates how infection with *E. tenella* may induce clinical signs of disease. Low-grade infection, that is, infection with few parasites, is benign and there is probably a balanced host-parasite relationship. Infection with very large numbers of sporulated oocysts will induce a condition of disease in those chicks which have not previously experienced any considerable degree of infection, clinical symptoms being initiated by the simultaneous maturation of excessively large numbers of second generation schizonts which cause sudden and violent haemorrhage between the 96th and 120th hour following the ingestion of oocysts.

Haemorrhage may be rapidly followed by death. If the chick survives this schizogonous phase the life-cycle of the parasite terminates with oocyst production which commences on about the seventh day following infection, rises rapidly to a peak and then subsides. Complete elimination of oocysts does not necessarily coincide with the termination of the life-cycle but is related also to the speed of elimination of the caecal cores which result from haemorrhage and oocyst production.

Immunity.—The chick becomes substantially resistant to reinfection following even light infection ; for example, the ingestion of less than 1,000 mature oocysts. This resistance is believed to be life-long although, as the oocysts of *E. tenella* appear to be ubiquitous wherever chickens are kept, it is possible that resistance is ordinarily reinforced by continual reinfection at a very low level.

Therapy.—Therapeutic control of disease caused by *E. tenella* is dependent on suppression of the second generation schizonts, the maturation of this developmental stage being the only demonstrable reason for the clinical appearance of disease. Sulphamezathine is highly effective because it has a marked action on these schizonts, the therapeutic effect being particularly marked under laboratory conditions when treatment commences at the 48th hour and is continued for three or four days. In many of the earlier experimental observations, when therapy was delayed for 48 or 72 hours, the effect of the drug on stages of development other than the second generation schizont was not apparent. More recently it has been shown that sulphamezathine does, in different degree, affect other developmental stages. In general, the earlier developmental stages of *E. tenella* are less affected, by a given concentration of the drug, than are the later stages, the first 24 hours of normal development being unaffected by all but high concentrations of the drug.

Laboratory observation has shown (Kendall & McCullough, 1952) that permanent suppression of the infection is in some way dependent on immunity resulting from the successful development of earlier stages of the parasite. If development of the first generation schizonts is inhibited by the use of high concentrations of sulphamezathine (*e.g.*, 1 per cent. of the drug in the food), cessation of treatment allows the normal cycle of development to be resumed and the number of second generation schizonts which finally mature may be sufficient to cause considerable haemorrhage followed by death of the chick.

Optimal therapy, therefore, will be attained by treating only at the time when the second generation schizonts are developing and, ideally, by avoiding interference with the development of earlier stages of the parasite. Under laboratory conditions such a procedure is possible, the initiation of treatment being postponed until some time after the 48th but before the 72nd hour following the administration of the infective inoculum. This ensures that an effective concentration of the drug is attained at the time when the majority of the parasites are in the earliest phase of the second generation schizont. Treatment is then highly efficacious. In the field, however, infection is likely to be contracted by different individual chicks at different times. Although the prompt initiation of flock treatment is favoured by the fact that a few chicks are likely to show clinical evidence of disease before the rest of the flock it is clear that interference with the early developmental stages of the parasite may occur in many of the birds, this leading to delayed bleeding and death. It is not immediately apparent how treatment can be arranged so as to affect only one particular developmental stage of the parasite. It has already been suggested that reduction in the amount of

sulphamezathine which is administered accentuates the differential effect on the various developmental stages of the parasite and that the second generation schizonts are more susceptible than any others. Unfortunately the level of drug necessary to control acute disease in the field is not, in practice, likely to differ significantly from that which can induce some measure of inhibition in the earlier developmental stages and so lead to delayed mortality.

To avoid this difficulty some form of interrupted treatment is necessary. Interrupted treatment has, in fact, been recommended for other reasons for a number of years, but there appears to have been little uniformity in practice, different schedules having been recommended by different authors. In a recent series of observations (Davies & Kendall, 1953 (in press)) the relative effects of the 3-2-3 and the 2-3-2-3-2 schedules of interrupted treatment on the various developmental stages of *E. tenella* are compared. It is suggested that any type of treatment which includes an interval exceeding two days without drug is likely to be ineffective in practice.

It is of interest to consider the relative value of different schedules of treatment in the control of disease acquired, as in the field, over a period of days. In the field the course of an epidemic, *i.e.*, the rate at which flock infection is contracted, is likely to vary considerably. Certain general assumptions can, however, be made.

The Course of Field Epidemics of Caecal Coccidiosis.—Under some circumstances, for example following the movement of a group of fully susceptible birds to highly infective conditions, all chickens are likely to contract heavy infection within a few hours; blood will be noticed on the evening of the fourth day following the move and within 24 hours all the chicks may die. In these circumstances, no form of treatment is effective.

On the other hand, the flock infection can be contracted over a considerable period of time. Very low-grade infection may be acquired over a period of several weeks but in these circumstances a condition of epidemic disease will not arise. It is axiomatic to assume that an epidemic, a condition of hyperinfection in a high proportion of the flock, must arise from infection acquired over a comparatively short period of time. With this in mind the data recorded in Figs. 1, 2 and 3 indicate the effect of three types of treatment on infection which is acquired by successive groups of chicks over a period of 10 days.

Data Recorded in Figs. 1, 2 and 3.—These figures are designed to compare the effect of treatment using 0·2 per cent. sodium sulphamezathine substituted for the drinking water for :—

(1) A continuous period of five days.

(2) An interrupted schedule of three two-day periods of treatment with intervals of three days without treatment, and

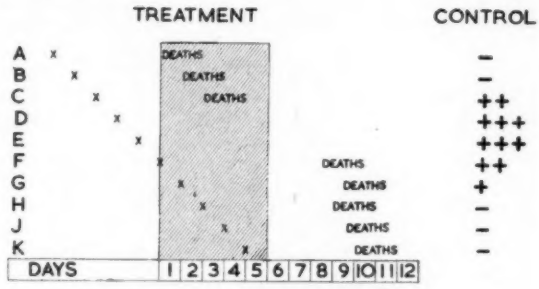
(3) An interrupted schedule of two three-day periods of treatment with a two-day interval without treatment.

Each figure illustrates the effect of the particular type of treatment in controlling infection which is acquired by different groups of chicks (A to K) over a period of 10 successive days, the days on which infection is acquired being indicated in the figures. When comparing the results with those likely to be experienced in the field, the various groups of chicks (A to K) should be regarded as units of a single flock, treatment being initiated (Day 1 in each of the figures) at a time comparable with that likely to be adopted in the field.

The relative efficacy of the three types of treatment is recorded in each figure in the column headed "Control," a negative sign indicating little or no therapeutic effect and three positive signs indicating complete control of the disease. The mortality rate was the criterion by which the success of treatment was judged. Two positive signs indicate about 30 per cent. and one positive sign indicates about 70 per cent. mortality as compared with 100 per cent. mortality with the untreated disease.

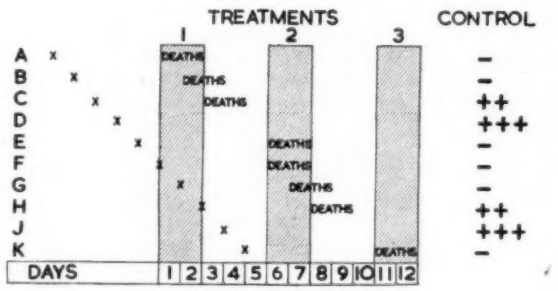
5-DAY TREATMENT

FIGURE I.



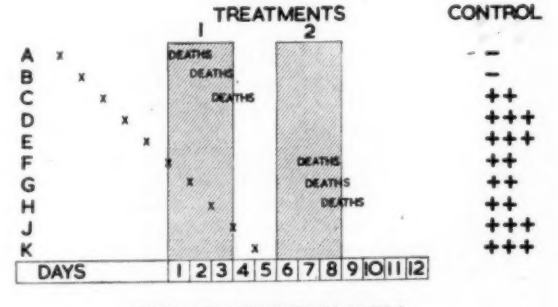
2-3-2-3-2 INTERRUPTED TREATMENT

FIGURE II.



3-2-3 INTERRUPTED TREATMENT

FIGURE III.



SHADED AREAS DENOTE PERIODS ON DRUG
X MARKS DAY OF INFECTION

The actual days when deaths occurred in the various groups are indicated in the figures. The results are of particular interest when related to field experience of natural outbreaks of coccidiosis.

Fig. 1 (the five-day period of treatment) indicates a pattern of mortality quite commonly seen in Britain where this type of treatment has been practised for a number of years.

Blood-stained droppings having been noted by the poultry-farmer, treatment is initiated within 24 hours (Day 1 in the figure), this corresponding with the fifth day following the first infection of the flock (Group A). Mortality is noted during the first two days of the treatment period, Fig. 1 showing that this occurs in Groups A and B in which develop-

ment of the parasite, acquired five and four days earlier, has passed the stage when treatment can be effective. On the third day of treatment mortality decreases and one day later the disease appears to be under control. No further deaths occur until the third day following the usual five days' treatment, when a considerable number of chicks may die over a period of three or four days. With or without an additional period of treatment the epidemic then terminates.

The clear division of the mortality (Fig. 1) into two phases, separated by four or five days when the disease appears under control, is in part attributed to the delaying effect of the drug (clearly demonstrated in Groups F and G of Fig. 1, where deaths occur on the seventh to ninth days following infection instead of on the fifth day as with the uninhibited disease) and in part to the length of the period of time over which the flock infection is contracted. While the general pattern of mortality indicated in Fig. 1 simulates that often seen under field conditions, it is a matter of experience that, in the field, disease control is often more satisfactory than would be suggested by the results indicated in Fig. 1. In relating these laboratory observations to field experience it is necessary to remember that the rate at which a natural flock infection is contracted is not necessarily constant and it is reasonable to suppose that the peak of infection will often be reached at a time corresponding to the third to fifth day following the first infection. This, it is shown, is the period during which treatment initiated at the first appearance of blood is most efficacious. Consequently, flock treatment in the field is likely to be more satisfactory than the results in Fig. 1 at first suggest.

Nevertheless, a continuous period of five days' treatment (Fig. 1) is clearly less satisfactory than the 3-2-3 type of treatment indicated in Fig. 3 because the latter permits a substantial therapeutic effect on all groups except those in which mature infection is already established. The advantage of this type of treatment, as described by Davies & Kendall (in press), is that the selective effect of the drug ensures that the vast majority of the parasites are in the very earliest phase of the second generation schizont at the time a period of treatment becomes effective. Under such circumstances control of the disease is assured in a high proportion of the chicks.

By contrast it has been shown that any form of interrupted treatment which involves withdrawal of the drug for a period exceeding two days is unlikely successfully to control mortality.

Interrupted treatment using the 2-3-2-3-2 schedule, as shown in Fig. 2, can be effective to a very much more limited extent.

Conclusion

It may be concluded that an interrupted schedule of treatment consisting of two three-day periods of treatment separated by two days without treatment is likely to be most effective in controlling mortality due to caecal coccidiosis.

Treatment must be initiated at the first appearance of haemorrhage and the level of the drug must not exceed that corresponding to 0·2 per cent. of the sodium salt of sulphamezathine in the drinking water.

References

Horton-Smith, C., & Taylor, E. L. (1945). *Vet. Rec.* **57**. 35.
Kendall, S. B., & McCullough, F. S. (1952). *J. comp. Path.* **62**. 116.

will imply in the future that it conforms to the description and standards detailed in the Codex. It is to be hoped that veterinary surgeons will come to require this specification for all products they use in their practice.

This book will have to be possessed by every veterinary practice, every chemist dispensing veterinary medicines and all manufacturers of products designed for the treatment of animals.

REVIEW

[**British Veterinary Codex, 1953.** Pp. xxiii + 737. Price 45s. (postage 1s.). London: The Pharmaceutical Press, 17, Bloomsbury Square, W.C.1.]

In 1950, by the direction of the Council of the Pharmaceutical Society of Great Britain, and with the help and advice of the Royal College of Veterinary Surgeons and the British Veterinary Association, a Committee was created with the task of producing a British Veterinary Codex. This Codex was to define standards for the many substances and preparations used in the prevention and treatment of animal diseases and to give authoritative information on their actions and uses. The work of gathering this information was delegated to a number of sub-committees with specialised terms of reference; these sub-committees were Actions and Uses, Biological Products, Formulary, Analytical Standards, Antibiotics and Hormones. These committees were manned by numbers of veterinary surgeons and other scientists with specialised knowledge of the subjects to be defined, and they had available a number of corresponding members, in this country and overseas, to consult when needed.

There can be no doubt that the publication of this work constitutes a landmark in veterinary history. All concerned must be congratulated on the very considerable amount of work that must have been necessary to produce this outstanding book in a period of little over three years. Certainly it is an excellent example of the results of committee work at its best.

The arrangement of the book follows, to some extent, that already made familiar by the editions of the British Pharmaceutical Codex. Part I comprises monographs on drugs, chemicals and related substances. Part II is concerned with antisera and vaccines for bacterial and viral infections. Part III is a formulary. There follows a long list of appendices mostly concerned with details of various potency and purity tests. Appendix XVI consists of a list of preparations described in the Codex with their equivalent proprietary trade names. With this clear lead veterinary literature should in time abandon the use of trade names and adopt the official titles for drugs.

Each substance is entitled by its English name, although synonyms are given, including the Latin equivalent. A definition of the substance follows, any identification tests, and in the case of biological products, tests for safety, potency and suitable conditions of storage. The doses for the relevant species of animals are also stated. The sections on actions and uses are admirable for their clarity and conciseness, although it is inevitable there will be some disagreement in some readers' minds over the uses of such a wide range of preparations. The amount of information provided varies considerably, the actions and uses of crystal violet swine fever vaccine are tersely stated in four lines, whereas in the case of phenothiazine there is over one page of closely written text, and the actions and uses of benzylpenicillin (penicillin G.) occupies three pages. Nevertheless, even in these cases, the amount of information is in a proper balance to that which is known *and generally accepted*, but those who will be looking for the unusual and unorthodox must look elsewhere.

The scope of the Codex is intended to cover some of the requirements of various parts of the British Commonwealth, and so it includes monographs on trypanocidal drugs, and other preparations for blood protozoal infections. Part II has monographs on a number of vaccines and sera in common use in tropical countries.

In this work the veterinary profession has for the first time an authoritative book laying down standards for purity, safety and potency of the many agents for the treatment of animals. The use of the words B.Vet.C. on the label of any preparation

THE ROYAL ARMY VETERINARY CORPS

Until a few years before the Napoleonic Wars there was no veterinary service in the British Army. The care of chargers and other horses was left to the farriers ; men trained in the forge rather than in the hospital ; hard-working, long-suffering, but uneducated and ignorant men. It was not surprising that disease was rampant and that a great many horses died from illness and neglect. The losses in Holland, in the year 1795, were so startlingly heavy that it was decided to appoint veterinarians to the cavalry regiments. This was done in the following year, when for the first time the description " Veterinary Surgeon " was coined by a Board of General Officers, and became part of the English language.

In origin, the Royal Army Veterinary Corps thus goes back to 1796, and the story of its gradual evolution from that date until 1918—when the Corps became " Royal " —has been well told by Major-General Sir Frederick Smith, K.C.M.G., C.B., Director-General Army Veterinary Service before the first world war. His history of the Corps was published in 1927, and makes fascinating reading. It affords an insight into Army life and conditions over a period of 130 years, and vividly portrays the difficulties and frustration which the Army Veterinary Service seems to have encountered at every stage of its development up to the second decade of the present century.

[*Photo by Fey*

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During the first world war the number of officers serving with the Royal Army Veterinary Corps was 1,668, of whom 381 were decorated. R.A.V.C. other ranks totalled 41,755.

THE R.A.V.C. IN THE LAST WAR

The mechanisation of the Army, which took place before the outbreak of the last war, caused the virtual disappearance of the horse and mule from the military picture, and it looked for a time as though the scope of the R.A.V.C. was going to be reduced almost to vanishing point. However, the mobilisation in 1939 of the 1st Cavalry Division " gave a temporary fillip to the Corps, and when the division moved from England to Palestine with 8,000 horses, 21 R.A.V.C. officers accompanied it with high hopes of active operations." The move involved 24 train loads of animals, and 16 shiploads. Veterinary staff accompanied all trains and ships, while R.A.V.C. units had been established at Dunkirk and Marseilles to provide facilities for rest and the treatment of casualties. These units later formed part of the B.E.F.'s quite extensive veterinary services, all of which—with the exception of one Indian Mule Company—were subsequently evacuated at the time of the Dunkirk withdrawal.

Animal Transport

Mechanisation of the Cavalry Division in 1941 caused considerable despondency in the R.A.V.C. However, the value of animal transport, both pack and wheeled, was becoming apparent to the authorities. Partly on account of the need for economy as regards rubber and petrol, several horse transport companies—each with about 500 animals—came into being. About 3,000 of the Cavalry Division's horses (including thoroughbred hunters) were trained for draught purposes ; and to these were added light-draught horses and mules. And as the war continued and pack animals proved their worth in operations in mountainous country, numerous pack transport companies and mountain batteries were formed.

The following, based on material published in the *Journal of the R.A.V.C.*, gives an idea of what mule transport could and did accomplish.

In the mountains of Eritrea, where the enemy was making a determined stand after having been driven back across the plains, two mule transport companies were employed to carry supplies up to our advanced positions. Sappers had, where necessary, made narrow winding tracks, and up these toiled the mules, carrying mortars, machine guns, shells and S.A., ammunition, rations, water, hot tea, and—occasionally—even live sheep for the Indian troops. Two or three journeys, each involving a climb of up to 2,000 feet, were made by a mule in a day, or—on routes where the tracks came under enemy fire—during the night. The hard going, up steep slopes, was aggravated by the lack of shade and a day temperature of up to 120° F. By contrast, the nights were bitterly cold.

There was one Veterinary Officer in charge of both companies, and the latter each had one R.A.V.C. sergeant and two R.A.V.C. privates. As it was not possible to evacuate animals to the nearest veterinary base hospital, 700 miles away, a small hospital was established locally. As time went on, roughly 100 sick or injured animals were treated there. Mules captured from the enemy, and mostly in a shockingly debilitated condition, were also cared for in the hospital, and their numbers, by the end of the action, had increased to some 200.

Only a few mules were killed, but many were wounded as the result of bombing and shelling ; and gunshot wounds were numerous. The R.A.V.C. N.C.O.s did excellent work dressing the injured animals and performing minor operations for the removal of shrapnel and bullets. In the temporary absence of R.A.M.C. personnel, the veterinary orderlies also attended to the minor injuries of the men—the slightest scratch, if untreated, developing into a " desert sore."

The Veterinary Officer inspected the sick animals in the hospital, and performed any necessary operations, before

breakfast. Most of the remainder of his day was spent visiting the widely separated advance mule lines and inspecting the animals, deciding which should be rested, which evacuated to base hospital, and which sent back to duty. In the latter case, the decision was influenced by the necessity that every mule which could work should do so, in order to ensure that essential supplies continued to reach the men fighting above.

When this campaign came to an end, there was nothing but praise for the mules, whose condition remained good in spite of the hard work and the rather poor forage which was all that was available. In other theatres of war mules were similarly in evidence. During the winter of 1943 and the spring of 1944 the quayside of the ancient port of Beirut echoed to the braying and clatter of thousands of them, bound for Italy, being loaded into cargo vessels converted into modern Noah's Arks. Monte Cassino, Monte Cairo, the attack on the Gothic Line . . . the mules were there, proving that far from being an anachronism in modern warfare, they were essential in carrying stores to the soldier fighting in the hills.

Several hundred mules, and a number of riding horses, were supplied in 1944 to Marshal Tito. The latter's partisan units, while training in the island of Vis, were under the supervision of British officers, and a senior R.A.V.C. officer was responsible for the provision of veterinary instruction and stores to the Partisans, who proved good pupils.

Farther from home, in South-East Asia Command, well over 2,000 mules and ponies were flown, together with veterinary personnel, into enemy-occupied Burma, during 1944. And after the re-occupation, mobile veterinary sections, field laboratories, veterinary hospitals and convalescent depots played their part in keeping supplies on the move through difficult country.

Remount Services

The year 1941 was a momentous one for the R.A.V.C., for it was then that the Corps assumed the duties of the former Army Remount Department, thereby increasing its commitments and doubling its establishment. The change, which was both logical and likely to improve efficiency, meant that the Corps became responsible not merely for the care of sick and injured animals, but also for the purchase, training and maintenance of all reinforcements. Purchasing commissions were appointed and functioned in Iraq, Persia, Cyprus, the Sudan, North Africa and Sicily, obtaining suitable animals, concentrating them at places conveniently near ports or railheads, and dispatching them to the various remount depots. Here they were classified, conditioned, trained, shod and finally posted to units.

Special units were formed with a dual veterinary and remount purpose ; namely, to evacuate sick and injured animals and simultaneously to supply remounts as replacements.

In May, 1942, an Indian Remount Purchasing Commission began buying animals in South Africa for shipment to India, and it became the duty of the South African Veterinary Corps to conduct these animals from Durban to Karachi. Between August of that year and September, 1945, a total of 38,151 animals—58 shiploads—were sent by sea. These included some 22,000 mules, 10,000 donkeys and 3,500 horses.

War Dogs

The scope of the R.A.V.C., which had seemed so limited in the early part of 1941, was broadened by yet another commitment—the provision and veterinary care of war dogs. Several units were formed for this purpose.

The mere presence of guard dogs patrolling the perimeter of depots and camps at night has proved a deterrent to theft. In the Middle East, between 1942 and 1948, guard dogs were responsible for 3,398 arrests and the recovery of £94,000 worth of Government property, one Boxer called " Simi " being alone responsible for 138 arrests.

Livestock Depots and Food Production

In the Middle East it was decided, in 1941, in order to reduce the shipping space required for meat, to purchase large numbers of cattle and sheep from various M.E. countries. The difficulties involved in the purchase and transport of these animals were considerable, and it was found that the hardships of long journeys, by road and rail, affected their condition to such an extent that slaughter—in the absence of a preliminary fattening period—proved uneconomic. The Royal Army Service Corps had no units which could undertake this task, nor officers and men with the necessary knowledge of cattle and sheep, so the A.D.V. & R.S., Ninth Army, volunteered to run an experimental Army stock farm in Syria.

Farms

This farm was started on a disused camp site in 1942. A good supply of water was available and 30 wooden sheds—each fitted with a continuous manger—afforded accommodation for a total of 1,500 head of cattle. Each " kraal," containing 50 or 60 animals, was placed under the charge of a private soldier, and in a short while the unit settled down happily to its unaccustomed task. Difficulties, of course, arose. There was no cake crusher available, and a steam-roller loaned by the Sappers for the purpose used up more cotton-cake as fuel than it crushed, so its use had to be discontinued ! At last machinery arrived from Palestine but, on being assembled, proved to be a grain mill. Removal of some of the milling plates, however, converted it into a very effective cake crusher. In order to prevent fighting, and hasten fattening, it was decided to tie the cattle. This was accomplished by fixing horizontal poles along the sides of the sheds and engaging native labour to cut and splice 10,000 feet of rope into 8-foot lengths. During the first six months 60 calves were reared, with only two losses ; silage was made ; and over 3,000 head of cattle were graded and dispatched to War Department abattoirs in Syria, Palestine and Cyprus. Sheep were later added to this farm, together with 1,000 kids for Indian troops.

The scheme proved so successful in improving the quality of the meat and in conserving the supply of animals that further livestock depots were set up. And in 1943 an Army Pig Breeding Scheme was put into operation, in order to make good use of swill from the camps and provide the troops with bacon. Each farm was laid out to accommodate 500 pigs, including 50 breeding sows. Breeding stock was obtained by the purchase of Middle White sows in Palestine and Syria, and Black sows in Cyprus. The piggeries were models of their kind, and the care of the pigs was on modern, scientific lines. An appeal from the Medical Service for rabbit meat for patients in military hospitals, as a substitute for chicken, led to rabbitries, each with 100 breeding does, being added to the pig farms.

In 1942 responsibility for the inspection of meat was assumed by the R.A.V.C. in the Middle East—a function which has long been performed on the widest scale by the Veterinary Corps of the United States Army. Responsible N.C.O.s were trained to act as assistant inspectors of meat ; model abattoirs were built, equipped with ample lairage accommodation, and sited with a view to adequate rail and road facilities for the rapid distribution of meat by the supply services. In the Middle East, where certain parasitic conditions communicable to man are widely prevalent, the Corps

had the satisfaction of eliminating danger from this quarter, and although the work was not spectacular it was certainly important.

In Malaya, too, the R.A.V.C. were concerned with food production. When the rapid advance of the Japanese had threatened the food supplies of British troops, the Governor asked the veterinary services to take what measures they thought fit. Accordingly, the R.A.V.C. imported 17,000 head of cattle from the Netherlands East Indies, and herded, fed and moved these animals south—along the already congested roads—as the Japanese advanced, slaughter being carried out as meat requirements demanded.

When Malaya was re-occupied the veterinary services were made responsible for the import of livestock, both for slaughter and for agriculture ; animal husbandry ; the control of livestock movement throughout the country ; the prevention and treatment of outbreaks of disease ; and the supervision of abattoirs and meat inspection.

After V.E. Day

On the conclusion of hostilities in Europe there was still a great deal of veterinary work to be done. In Germany veterinary officers were, where possible, attached to each *kreis* in the British Zone and dealt with some of the many military and civilian problems awaiting solution. In Austria one of these problems concerned the feeding, care and disposal of ex-German horses. In Carinthia alone, which is about the size of Wales, no less than 58,000 weary, hungry horses had been foisted on land unable to support them, and became the responsibility of the R.A.V.C.

Figures for the War 1939–1945

Categories	1939	1945
British Officers	86	519 (*d*) (*g*)
B.O.R.s	105	3,839 (*a*)
Indian Commissioned Officers... ...	17	251 (*e*)
Indian Veterinary Assistant Surgeons ...	121	329 (*c*) (*f*)
Indian Other Ranks	521	6,385 (*b*)
Indian Clerks	58	319
Followers	90	755

(*a*) U.K., Europe and Mediterranean theatres only.
(*b*) India, S.E.A.C. only.
(*c*) India, S.E.A.C., M.E.F., C.M.F., B.E.F.
(*d*) All theatres.
(*e*) Including 43 M.R.C.V.S.
(*f*) Not M.R.C.V.S.—Indian qualification.
(*g*) Including about 50 non-Veterinary Officers.

The theatres in which the Corps was represented were B.E.F. (later 21 Army Group), Norway, Middle East Forces (including Eritrea, Cyrenaica, Egypt, Palestine, Syria, Iraq, Aden, Greece (1941), C.M.F. (including North Africa, Sicily, Italy, Yugoslavia), India and S.E.A.C.

THE R.A.V.C. TO-DAY

Equitation

So much for the R.A.V.C. in war. Now what about its present "peace-time" activities ? An excellent place in which to obtain some insight into these is the Corps Depot—the Veterinary and Remount Centre at Melton Mowbray—and happily the visit which I was privileged to make there coincided with a demonstration of war dogs, and with the last few days of the 1949–50 Equitation Course.

Ever since the closure of Weedon, in 1939, the R.A.V.C. has been responsible for all training of riding instructors in the British Army ; and while a course is in progress, the Equitation Wing of the Remount Depot becomes the Army Equitation School. Put in another way, it is left to the R.A.V.C. to ensure that Army horsemanship is kept alive in this mechanical age, and that a nucleus of instructors is kept always in existence, ready to train others should a sudden emergency call for expansion.

The interesting point about the six months' equitation course is that horses and humans are trained at one and the same time. The students—officers and men from the Household Cavalry, the King's Troop of Royal Horse Artillery and the Royal Army Service Corps—are each given three horses to look after when they arrive. One of these horses is trained, one half-trained and the third "green." The idea is that, by the end of the course, the half-trained horses will have become fully trained and the "green" ones half-trained.

Remounts are mostly destined to become officers' chargers and troop horses in the Cavalry or Royal Horse Artillery ; the latter also requiring horses for outriders and gun-teams. About 60 horses a year pass through Melton Mowbray. They are bought as four- or five-year-olds : all blacks for the Household Cavalry, greys for the trumpeters, and skewbald for the drum-horse.

On arrival the remount is exercised and conditioned by training which corresponds very much to the recruits' P.T. Until fit, it is not ridden. Then follows not breaking-in, but a period of very gradual schooling. First, it is accustomed to being led, and if it tends to shy at some particular object, is even encouraged to feed off the latter, and so lose its fear once and for all. Next comes work with the lungeing rein, and then with double reins ; the animal learning to associate the spoken word of command with each movement, and then to obey the pressure of the reins alone. The R.A.V.C. can afford to, and does, spend far more time over the training of its remounts than is economically possible in the case of the ordinary civilian animal.

For the officers and men the Equitation Course is a strenuous affair. In the beginning they spend about two hours a day in the saddle, gradually increasing this to about four and a half hours. After a month of harness cleaning, "mucking out," and instruction in animal management comes the first test. After passing this each officer is allotted a groom. For the next five months—at the end of which they face a somewhat gruelling passing-out examination—the students acquire proficiency in equitation, dressage, the training of horses, the art of instructing others, and a knowledge of veterinary first aid. They are taught show jumping and how to ride over steeplechase fences and across country, and are taken through the various stages leading up to a counterchange-of-hand at the trot, and a half-pass and change at the canter. Mounted sports are also included in the training programme

A regular feature of the course is the "Rabbit Fund," to which students contribute sixpence for falling off a horse or threepence for dropping a whip. Instructors pay double, or are liable to do so ! The first student to fall off (or, as a civilian would say, to be "thrown") is usually appointed treasurer, and the proceeds are spent on a grand celebration to mark the end of the course.

As the Veterinary and Remount Centre at Melton Mowbray is also the Corps' Depot, it follows that R.A.V.C. personnel receive their training here. And among the courses is one for National Service veterinary officers, who do two months' training before being posted to a unit. For them the day begins with an eight o'clock parade, followed by foot-drill, equitation instruction, work at the Dog School and a number of other duties. They have, of course, completed their five years' professional training before being commissioned in the R.A.V.C.

There is available at the Veterinary and Remount Centre an up-to-date veterinary hospital with the most modern methods of diagnosis, including laboratory aids. Treatment is also on the most modern lines, and it is interesting to observe the thoroughness with which records of an animal's health are kept. The buildings and equipment include operating theatre, X-ray and diathermy departments.

Number 2 School of Farriery, Melton Mowbray, besides giving instruction to equitation students and others, does valuable work in training much-needed farriers for civilian life.

War Dog Training

Dogs for service in the Army are mostly bought at about 18 months old. On arrival at Melton Mowbray they are subjected to a very thorough veterinary examination ; even blood samples being taken. If adjudged fit, exercising and training begin, only those dogs which show promise being retained. Obedience is the first essential, and by means of infinite patience—and rewards in the shape of pieces of meat—all war dogs are taught to obey five commands : " Heel," " Sit," " Lie," " Come " and " Stay." That represents their basic training, so to speak ; afterwards their specialist duties are taught, and these may involve one or two additional words of command.

Liaison dogs are trained for message-carrying, and could be of great service in countries where local conditions render radio " walkie-talkie " equipment almost useless. Patrol dogs, usually Alsatians, are trained to indicate isolated enemy positions, *e.g.*, machine-gun nests or listening-posts, by " pointing." They have had a marked effect in raising the morale of patrols advancing through jungle or scrub. Other dogs are trained to locate wounded men, and as they can quarter a large area of ground in a very short time, and can work in darkness, they bring help to casualties, many of which would otherwise be missed by stretcher parties.

Then there are pack dogs—animals weighing about 80 lb., and trained to carry a load of 40 lb. in two panniers. It will be appreciated that four such dogs can carry as much as a mule.

The longest period of training, 12 months, is required for a tracking dog ; the quality of the latter's performance depending a great deal upon the understanding of " master," and the length of time they have been working together.

Perhaps the most fascinating of all to watch are the mine-detecting dogs, which can work successfully along a railway line—the metal of which completely masks the effect of a mine-detecting instrument. The training of these dogs is achieved by scattering pieces of meat for the dog to find and eat. Later the meat is put into open tins and buried. In the next stage, tins are buried without meat and the dog is rewarded every time it finds one.

An important side of the work at Melton Mowbray is the training of dog handlers. These come from the various units to which dogs are to be issued. Each fully trained dog is allotted two handlers, who work with it during the whole of their course and accompany it back to their unit. There must be a real partnership between handler and dog. This is especially important in the case of the guard dogs, which must obey their masters' commands and no one else's. They are, indeed, not amenable to strangers, and if for some reason posting of one or both of their handlers becomes necessary, the dog is always returned to the school and retrained with two fresh handlers. At the demonstration, incidentally, the Alsatian guard dogs displayed not merely obedience and pugnacity, but also a considerable affection for their masters.

Many war dogs trained by the R.A.V.C. are now on duty with our troops overseas : in Germany, Egypt, East Africa, Hong Kong and Malaya. G. P. W.

CLINICAL COMMUNICATION

PARALYSIS OF SHEEP IN KENYA DUE TO FOCAL AND SYMMETRICAL SPINAL POLIOMALACIA

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Introduction

This communication records the occurrence in Kenya of an hitherto undescribed paralytic disease of sheep, associated with symmetrical degenerative and reactive lesions limited to the ventral horns of the spinal grey matter, and with a focal distribution. The term " poliomalacia," as used here, following the suggestion of Dr. J. R. M. Innes, implies a condition which, so far as present knowledge goes, is primarily a degenerative one involving all specialised nervous elements of the grey matter ; inflammatory changes, in the usual sense, are minimal or absent. The cause of this condition has not yet been established, but the affected flock has been shown to have a low copper status as reflected in low liver and blood copper, but the pastures are not Cu deficient as far as is known.

The disease was reported from only one farm which is situated between Lake Naivasha and a small subsidiary lake, isolated from it during the last 15 years or so by fall of the water level. The flock consists of a mixture of high-grade Corriedale and Merino-Corriedale grade ewes, which run all the year with grade Merino rams ; lambs may thus be born in any season. In this locality the short rains in September and October are followed by a long dry period from November to April. Towards the middle of the latter, available grazing becomes restricted to a strip about 100 yards wide along one edge of the subsidiary lake, this area being subdivided into an inner zone where the vegetation consists largely of sedges (*Cyperus* spp.), and an outer one which is almost a pure sward of Kikuyu grass (*Pennisetum clandestinum*). There are very few contaminating species, and there are no known poisonous plants which would come under suspicion. The sheep drink water from the lake.

The first cases were reported to have occurred during February, 1952, and before the end of April 10 lambs, out of an approximate total of 40, had been affected ; all were between two and five months of age and all died. The disease then ceased abruptly with the arrival of the long rains and no more cases were seen until January, 1953. Between that date and mid-April, nearly 60 animals out of a total of 240 had died or had been destroyed because of this condition. A proportion of these sheep were up to about 18 months of age. Again no new cases appeared after the long rains began. Cattle grazing exclusively over the same land were not affected.

Signs and Course

No premonitory signs were reliably noted. The first abnormality seen was a sudden loss of power in the limbs demonstrated by frequent and prolonged sinking down on the fore- and/or hind-quarters. There was no evidence of a febrile phase of the disease. Locomotor dysfunction appeared to involve predominantly the extensor muscles, especially those of the forelimbs, and resulted in a scrambling type of movement with the legs partially flexed (Fig. A). Where the forelimbs were solely, or most severely, affected there was a

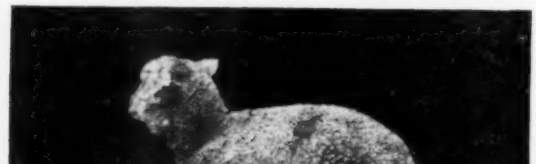

Fig. A.

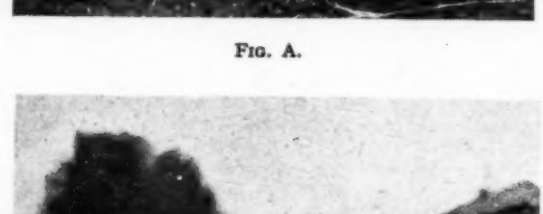

Fig. B.

tendency to develop a kangaroo-like gait ; this was seen in extreme form, seven weeks after onset of the disease, in one 18-month-old animal, which could walk 20 to 30 yards in a semi-erect position on its hind legs (Fig. B).

Where all limbs were involved, the paralysed sheep rapidly deteriorated in condition, but continued to eat if food was placed before them. A flexor response could be elicited, even terminally, by pinpricks in the region of the coronet. Death occurred in as little as four to five days, usually, however, after one to three weeks, probably due in some measure to progressive cachexia and anaemia (*vide infra*).

In two of three cases examined the cerebrospinal fluid was water-clear and non-coagulating. One of these samples was negative to Pandy's test for excess globulin and cell free. The third case yielded a yellowish coagulating fluid, which may have been mixed with plasma.

Pathology

No important changes, apart from cachexia, were noted outside the central nervous system. In the latter identical macroscopic lesions were seen in one sheep during 1952 and in several animals examined during 1953. In transverse cuts of some segments of formalin-fixed spinal cord each ventral horn of the grey matter showed a central, slightly depressed, brownish area of varying extent. With experience this lesion, if moderately extensive, was not difficult to detect and, as will be shown later, tended to be restricted to the cervical and lumbar enlargements. Slices of the brain showed no macroscopic changes.

A detailed account of the pathology will be published later by W. Plowright & J. R. M. Innes. The main features are briefly as follows : Significant changes were limited to the spinal grey matter, especially in the cervical and lumbosacral enlargements. The process was one of liquefactive dissolution of nerve cells, fibres and ground substance, beginning in the centre of the ventral horn—almost an infarct-like softening ; the lesions were bilateral at any particular level, having a symmetry almost like object and mirror-image. They apparently extended centrifugally, and only to a very slight extent into white matter.

Coincident with the degeneration there were marked proliferative changes involving particularly the microglia, which formed into dense masses of compound granular corpuscles (*gemästete Glia*). There were no haemorrhages ; perivascular cuffing or focal infiltrations by lymphocytes or neutrophil and eosinophil polymorphonuclear leucocytes were minimal or entirely absent. The meninges and ependyma showed no changes. A careful search failed to reveal the presence of any inclusion bodies in the nuclei or the cytoplasm of neurones, glia or ependyma. There was no demyelination.

Transmission Studies

Portions of the cervical and/or lumbar cord from typically affected sheep were, on two occasions, used to prepare 10 or 20 per cent. suspensions and these were inoculated in a dose of 1 ml. via the atlanto-occipital membrane into the subarachnoid space of two normal sheep. Rabbits and mice (both young and unweaned) were inoculated intracerebrally on each occasion, guinea-pigs on one only, and mice were also inoculated intraperitoneally. In one instance the emulsion used was prepared with cerebrospinal fluid. None of these inoculated animals developed any signs of paralytic disease.

Biochemistry

Blood examinations were carried out on normal and diseased sheep from this farm and established the following facts. Samples were collected during the period of occurrence of the disease in 1953 and in the week following its cessation (early May).

A. Most sheep and lambs showed markedly subnormal figures for haemoglobin and haematocrit (down to 2·9 g. haemoglobin per 100 ml. and 10 per cent. respectively).

B. An equally large number exhibited varying degrees of hypocupraemia (down to 0·2 μg. Cu per ml.). (Normal : 1·0 to 1·2 μg. per ml.)

Copper estimations on the livers of four affected animals revealed markedly subnormal copper storage in three. An examination of pasture clippings, and of lucerne produced on adjacent lakeside land, showed values for copper and molybdenum which were within normal limits.

Discussion

Preliminary investigations of this disease show it to be remarkable in that its pathological basis was a focal malacic change involving exclusively, in a rather symmetrical manner,

spinal grey matter and which accounts for development of the clinical paralysis. The disease has thus been designated as a focal spinal poliomalacia. The tendency for the forelimbs to be most severely affected is an unusual feature.

The failure of the first attempts to transmit the disease, or to recover specific causal bacteria, together with the absence of true inflammatory changes commonly associated with the viral encephalomyelitides, focuses attention on the chemical findings, since plant poisons, hereditary factors, and cerebrospinal nematodiasis (Innes *et al.*, 1952), toxoplasmosis or cryptococcosis would seem to be excluded from any aetiological rôle. The low copper status might suggest that swayback, a demyelinating encephalopathy, should occur in lambs born on this farm. Swayback has never occurred in its classical form (see Innes & Shearer, 1940) in Central Africa so far as is known, but it is well recognised that the exact relationship between copper metabolism and swayback, *i.e.*, the pathogenesis of the disease, has yet to be determined (see Innes, 1950, and Marston, 1952). The clinical and pathological features of this spinal poliomalacia bear no resemblance to those of swayback, and if indeed the copper deficiency is a significant feature then it exerts its effects in a totally different manner from that observed elsewhere in the world.

It is possible that the copper deficiency is associated with a suboptimal intake of other elements, *e.g.*, cobalt, in which large areas of the Rift Valley of Kenya and this one, in particular, are probably deficient. Alternatively, prolonged copper deficiency and the associated anaemia may predispose the animal to the effect of toxic factors in the herbage or produce a conditioned deficiency of a metabolite essential for the normal functioning of spinal grey matter. Further transmission and biochemical studies are contemplated.

Summary

1. An account is given of an hitherto undescribed paralytic disease of sheep in the Rift Valley of Kenya.

2. Pathologically, the condition is characterised by a focal symmetrical spinal poliomalacia quite unlike that seen in any viral (or other) myelitis of animals or man.

3. Attempts to transmit the disease to sheep and laboratory animals have so far failed, nor have we been able to isolate any causal micro-organism.

4. The flock, as a whole, suffers from anaemia associated with hypocupraemia.

Acknowledgments.—The biochemical determinations recorded here were carried out by Mr. M. L. Burdin, B.Sc., M.R.C.V.S., to whom I am deeply grateful.

I also wish to express my thanks to Dr. J. R. M. Innes (present address : Chief, Pathology Branch, Medical Laboratories, Army Chemical Centre, Md., U.S.A.) for valuable guidance on the pathology and on the course of the investigation, and for suggesting the classification of the disease as a poliomalacia.

For permission to publish I am indebted to the Director of Veterinary Services, Kenya, and to Mr. A. J. Wiley for the photographs and identification of pasture plants.

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QUESTIONS AND ANSWERS

The submission of questions for inclusion in this column is welcomed ; they can relate to any aspect of veterinary work, but must be of a general nature—questions cannot be considered in which information is sought regarding diagnosis or treatment of specific cases, nor for which solely a private reply is desired. For purposes of record, each question is numbered, and those submitting questions are required to furnish (not for publication) name and address.

Answers to readers' queries represent exclusively the personal opinions of the writers, and criticism of the replies will be appreciated.

All communications should be addressed to the Editor.

Actinobacillosis and Allied Bony Swellings

Q. 440.—*Could you discuss the course and prognosis in these cases affecting the jaw in cattle, their incidence in herds and any new methods of dealing with them successfully? No straw is used for feeding on this farm, but the incidence seems unusually high. Treatment has so far been unsuccessful. Large doses of iodine, I presume, may affect pregnancy?*

A.—Swellings of the jaw bones of cattle are usually diagnosed clinically as actinomycosis. A small proportion of such swellings may in fact represent callus formation following fractures, or even on very rare occasions malignant neoplasms affecting the bone, but it is safe to say that probably over 95 per cent. of these swellings are actinomycotic in origin. Treatment of these conditions has never been very successful, chiefly because of the difficulty of ensuring that any drug used does actually come into intimate contact with the organism responsible.

Iodides seldom do more than limit progress of the disease temporarily. The effect on the animal of heavy dosage of iodides is well known, but it must be very seldom that any effect on pregnancy results. Most practitioners can recall having administered iodides to cattle at toxic levels without inducing abortion, or so far as could be seen in any way interfering with normal pregnancy. Good results in the treatment of actinomycosis of the jaw have been reported following direct injection into the lesion of penicillin in oil. This process can, of course, be carried out only in those cases where at either one or more points over the lesion there is sufficient rarefaction of bone to allow penetration by a stout needle. Others have claimed good results by the administration of sodium sulphapyridine intravenously, while others have claimed similar results from oral administration of sulphanilamide.

In those cases where teeth are loosened by the condition, it is advisable to remove them, thereby facilitating drainage, as well as removing dead and severely damaged tissue.

The incidence of actinomycosis of the jaw in cattle appears to be lower than was the case some years ago, but whether this arises from the present widespread use of antibiotic and sulpha drugs, it is impossible to say. The old idea that the organisms originated from barley must now be abandoned, as the disease occurs in areas where no barley whatsoever is either grown or fed to stock.

. . . . .

The "Freemartin"

Q. 441.—*Is a heifer calf, born twin to a bull, invariably a "freemartin"? Without knowing her history, can a "freemartin" be recognised before reaching maturity?*

A.—One in eight to one in ten "freemartins" are sexually normal and can be bred from. (Lillie, 1917.)

Calves at a few days old can often be recognised as "freemartins" by the appearance of the vulva. It looks as though the upper edges of the lips have been stitched together, leaving below a small orifice of about ¼ inch as compared with the normal of 1 inch. The lower edge may protrude abnormally exposing a slightly enlarged clitoris.

If it is possible to insert a rod or thermometer this will meet a firm obstruction when inserted a few inches. When the animal is older and it is possible to insert two fingers into the vagina no *os* can be detected, the end of the vaginal cavity feeling like the inside of a flat-bottomed tube. At a year old it is possible to insert a small hand into the rectum ; the uterus may be examined. The uterus is generally incomplete with either one horn or none at all, and there may or may not be a small ovary with vestigial tissue adjacent to it. As a rule such animals reveal marked growth of horns which resemble those of a bull.

REFERENCE

LILLIE, F. R. (1917). *J. exp. Zool.* **23**. 371.

. . . . .

Treatment of Squamous-type Eczema in the Bitch

Q. 442.—*I should appreciate advice regarding the treatment of stubborn squamous-type eczema in the bitch. The condition is definitely non-parasitic, and symptoms in these cases suggest a hormonal imbalance. Lesions commonly are confined to the anal and vulval region, and consist of intense pruritus, loss of hair, and hypertrophy of the vagina and vulva. Lines of treatment which have been tried without appreciable success include the use of stilboestrol, oestrone and thyroid.*

A.—It is difficult to give a really definite answer to the question. The hypertrophy of the vulva and vagina, coupled with irritation, suggest that ovarohysterectomy would probably relieve the condition. It is certainly worth consideration provided the animal is not intended for breeding. The frequent local application of 2 per cent. benzocaine in a water soluble ointment base might be tried to relieve the irritation, while the daily application of 3 per cent. salicylic acid in a water soluble ointment base is indicated on account of the scaliness. Phenobarbitone twice daily internally may also be used with advantage.

Some clinicians have reported marked temporary improvement in the skin condition when the patient has received penicillin for some intercurrent condition although, obviously, the basic cause is not affected.

. . . . .

The Sedation of Dogs in Boarding Kennels

Q. 443.—*Is there a safe and efficient sedative, administerable to dogs in boarding kennels, which will prevent continual barking, especially throughout the night? This barking can be a great nuisance, especially in a built-up area.*

A.—The respondent thinks the answer lies in attention to the following points :—

(1) The habitually noisy dog should be given an abundance of strenuous exercise during the day, sending a kennel boy out with it for long walks—especially in the late afternoon. Putting it out in a small run is not sufficient, as it merely sits at the door waiting to come in.

(2) The kennel should be *warm*, spacious and comfortable. A dog feeling the cold or having insufficient room to stretch, will keep awake.

(3) No food should be given until the latest hour, say 8 or 9 p.m., and it should then be a big meal. Dogs with a full stomach are likely to sleep.

(4) Sedation over two or three weeks would be improper, and even if it seemed imperative, nothing stronger than aspirin or the bromides should be administered.

ABSTRACTS

Siting, Construction and Management of Modern Abattoirs*

The bare essentials for a slaughterhouse site are freedom from fly-breeding grounds, water supply (150 gallons per animal), sewage disposal, a three-phase electric supply, and also gas if possible. There should be good road facilities. Rail facilities are not so essential for small market town abattoirs as for the larger town slaughterhouses. The provision of grazing land depends on local needs, and is in direct relation to lairage needs.

About two to two and a half cattle units will supply a high percentage of the meat needs of 1,000 people. The lay-out of the dressing rooms in " line " or " booths " will depend on the interests using the slaughterhouse. Covered lairages should be provided, and some small pens set apart for isolating sick animals and recalcitrant ones. Tie-ups will depend on the number of cows and bulls killed.

In line dressing, the distance between dropper and dressing hoist should be not less than 12 feet, and the number of lines will depend on the capacity of the slaughterhouse. The packing house method with chutes for offal, and several beds for ground work is not so suitable for this country as the line method. If necessary each wholesaler could use one line as his " booth." It is unlikely booths would actually be built, but that instead dressing areas would be set apart for each firm.

One stunning box with bleeding rail will deliver 15 cattle per hour to the dressing floor. For sheep and calves a dressing line for 10 to 12 men can put through 60 to 70 sheep per hour. There should be a stunning pen, cratches for bleeding and dressing, with rail and hooks for carcases and offal. Whether pigs need a separate hall is a matter of opinion. The difficulty about steam in the scalding process can be overcome. If there are days when about 200 pigs are killed, then a simple dehairing machine would be useful.

By-product rooms should be easily accessible, and cooling accommodation is most important. If throughput does not exceed 30 cattle and other animals per day, then a room with cold-blowers is sufficient, and there may not be any need for expensive refrigeration plants and insulated chambers. At experimental abattoirs at Guildford and Fareham a temperature of from 38° to 40° F. has been found sufficient for holding meat for four or five days, but possibly 34° to 36° F. might give better results.

Processing machinery is expensive, and inedible offal might be handled so as to reach a central depot in good order. The Boys Committee found a minimum slaughter of 800 beasts a week, with other livestock, justified the expense of a processing plant. Possibly public health reasons might compel the need for a small plant. Management by local authorities has not been challenged, but whether the control of the stock and slaughtering should be in the hands of the stock owners, local authority, or an association of stock owners would have to be decided by consultation.

D. J. A.

* **The Siting, Construction and Management of Modern Abattoirs.** ANDERSON, A. W., Director of Slaughtering, Ministry of Food. The Benjamin Ward Richardson Lecture, 1953.

* * * * *

Resistance to Nematode Infestation in Sheep*

Stewart deals with resistance to infestation with nematodes as distinct from resistance to the effects of infestation.

Trichostrongylosis is particularly a disease of young sheep but haemonchosis affects all ages. The phenomenon of " self cure " is regarded as a manifestation of resistance.

In sheep infested with *Trichostrongylus colubriformis* both the intake of larvae and infestation with adult worms stimulated the production of antibodies. Resistance to *T. colubriformis* could not be ascribed solely to advancing age, and previous exposure to infection had more influence on resistance than diet.

Resistance to infection with *Haemonchus contortus* was found to be irregular and antibody rise transitory. From experimental work it seemed that to stimulate "self cure" the intake of live larvae was essential and the site of the reaction was local rather than general and confined to the infected area of the alimentary tract.

H. contortus larvae could produce "self cure" of either *Haemonchus* or *T. colubriformis* but infection with *T. colubriformis* larvae produced "self cure" only of infestations with the same species—possibly because the passage of antigenic material from the *Haemonchus* larvae in the abomasum to the small intestine was possible, whereas similar material from the small intestine could not pass to the abomasum.

J. S. S.

* **Resistance to Nematode Infection in Sheep.** Stewart, D. F. (1953). *Proc. Pt. 1, Int. Vet. Cong., Stockholm.* **1.** 417-421.

* * * * *

Two-Phase Method of Surgical Relief of Hydrops Amnii*

A 20-month-old Hereford heifer, approximately six months pregnant, was subjected to slow drainage of the distended uterus 24 hours prior to caesarean section. Under local infiltration and epidural anaesthesia a 4-inch incision was made in the left sub-lumbar fossa. At the level of the fold of the flank a ½-inch horse trocar was passed through the abdominal wall from inside outwards. The cannula was then placed over the trocar and forced into position from the outside inward and the trocar was then discarded. A plastic tube was then applied to the internal end of the cannula and one end of the tube was drawn through the puncture wound to the exterior. A 12-gauge needle, which was attached to the other end of the tube, was inserted into the uterus and kept in position by means of a catgut suture. When drainage was satisfactory the abdominal incision was closed. The next day a caesarean section was conducted through a left flank incision incorporating the earlier incision with the patient in the standing position. The excess foetal fluids were found to occupy the allantoic cavity. The foetus lived for five minutes only. The placenta was removed manually 96 hours after the operation. The advantage of this two-phase procedure is the gradual release of splanchnic pressure and the avoidance of shock which might follow the too rapid release of the foetal fluids.

C. F.

* **A Two-Phase Method of Surgical Relief of Hydrops Amnii.** Wolfe, J. W., & Rice, W. M. (1952). *J. Amer. vet. med. Ass.* **121.** 359.

* * * * *

Inflammatory Response of the Bovine Endometrium*

Workers have previously shown in several species, including cattle, that pyometra or an inflammatory response can be produced by the introduction of semen into the uterus during the luteal phase of the oestrous cycle. Block and his colleagues, working with 10 virgin heifers and 18 mature cows, the latter clinically normal but "repeat breeders," have tended to show the inflammatory response of the endometrium is very variable in the mature animal when inseminated during the luteal phase but is almost constant in the heifer as typified by the presence of pus. Since it has often been postulated that the lowered fertility in cows which regularly return to service is due to early embryonic death, the present investigation infers that other factors than infection play a part in failure of implantation and embryonic death.

It is suggested that the relative non-responsiveness of the endometrium in the cow may indicate endocrine dysfunction; in the main, a progesterone deficiency and consequently an endometrium unsuitable for nidation of the fertilised ovum.

The authors also point out that some mechanism must be at work following fertilisation and nidation which stimulates development and persistence of the corpus luteum and thereby an adequate supply of progesterone. It is said that this stimulus comes from the embryo itself. If this stimulus is in the nature of irritation of the endometrium by the embryo and the endometrium is unresponsive, then the stimulus is not transmitted to the corpus luteum, which regresses with return of the cow to oestrus.

C. F.

* **Inflammatory Response of the Bovine Endometrium.** Block, W. G., *et al.* (1953). *Amer. J. vet. Res.* **14.** 179.

REPORT

[Colony of Trinidad and Tobago: Administration Report of the Director of Agriculture for 1951.]

The Department of Agriculture for Trinidad and Tobago is under the control of the Director of Agriculture with two Deputy Directors, one for Crop Husbandry and the other Animal Husbandry. The latter post, however, was vacant at July 31st, 1952.

The agricultural policy was apparently chiefly governed by an interim report of the Local Food Production Committee which received endorsement in principle by the legislature and which provided funds for its implementation.

Among the chief recommendations were:—

1. Optimum use of the land for the purpose to which it is best suited.

2. Increase in local food production.

3. Agricultural education of rural population to be a major function of the Extension Division of the Department of Agriculture.

4. Complete self-sufficiency in all respects not being a sound objective either economically or sociologically, and the increase in exports being essentially for maintaining the rising standard of living of the growing population, a proper balance to be maintained between production for local consumption and production for export.

As a result of these recommendations for an expansion in agriculture, the Animal Husbandry Division was also to be expanded and measures were to be taken to increase livestock by the importation of breeding stock, control of the slaughter of stock (such as the prevention of the slaughter of suitable breeding stock) and increase in production of feeding-stuffs.

During the year visits were paid by the Adviser on Animal Health to the Secretary of State for the Colonies, and, at the request of the Comptroller, Colonial Development and Welfare in the British West Indies, Mr. S. L. Hignett, B.Sc., M.R.C.V.S., of the Wellcome Veterinary Research Station, Frant, visited the colony and advised on animal breeding problems and infertility.

Animal Diseases Control

A regional foot-and-mouth disease consultative conference was held in the city of Panama in August at which the Deputy Director (Animal Husbandry) represented the Colony and headed the delegation from the United Kingdom. The main recommendations were the adoption of stringent regulations to prevent entry of this disease into territories where it does not exist and the creation of a fund to be used for implementing emergency measures.

The British Caribbean Advisory Council on Agriculture, Animal Health and Fisheries, held in Barbados, recommended that the Jamaica Diseases of Animals Act should be the model on which other territories base legislation, modified to meet local needs, to permit reciprocal exchange of livestock within the area under uniform regulations.

The Animal Diseases Reporting Service of the Caribbean Commission continued to operate during the year by issuing monthly statements of listed diseases.

The Veterinary Diagnostic Laboratory work consisted mainly in milk testing and pathological investigations.

The incidence of tuberculosis in water buffaloes continued to remain the highest of bovines tested, 28 per cent. Apparently the slaughter of reactors is objected to on account of interference with transport operations, especially at harvest.

Twenty-seven cases of paralytic rabies (bat transmitted) were diagnosed. Control of the outbreak was obtained by protective vaccinations assisted by the destruction of vampire bats.

The Trinidad and Tobago stock farms and district breeding units continued the work of trying to improve local horses, mules, cattle, sheep, goats, pigs and poultry by the use of imported and/or improved sires.

The Government invested $450,000 in the erection of a plant to convert citrus waste into a stock feed ingredient. The recommendations that an additional veterinarian and three junior livestock inspectors be posted to the Agricultural Department are indications that the need for an expansion in Animal Husbandry in conjunction with Crop Husbandry is now becoming increasingly recognised in this area.

H. H.-B.

ROYAL COLLEGE OF VETERINARY SURGEONS

Membership Examinations, December, 1953

List of Successful Candidates

(*Continued from page 16*)

London

Final Examination

Anderson, D. C.
Asghar, Saeed
Barley, A. P.
Basinger, Donald
Clifford, R. J.
Cochrane-Dyet, I. G. C.
Cox, J. A.
Cunningham, J. A.
Douch, J. A.
George, J. K.
Gillett, T. G. F.
Godfrey, M. J.
Govaerts, L. V.
Grattan, D. A. P.
Hawkins, Albert
Hunter, F. E.
Jones, J. E. (M)
Mackay, B. H. P.
Michael, J. R.
Morgan, D. B.
Samuel, R. M.
Shaw, D. L.
Stockwell, G. D.
Swann, A. I.
Taffs, L. F.
Tew, N. C.
Tucker, Miss J. W.
Tuckey, J. B.
Watson, K. R.
Whittaker, G. L.
Williams, J. R. L.

(M) denotes credit in Medicine.

Dublin

Second Examination

Dargan, Peter — Keane, M. J.

Physiology only

Allen, R. S. — Lee, J. G.
Barnes, Thomas — Mangan, P. J.
Cody, O. H. — Moloney, J. B.
Costello, E. A. — Murphy, P. A. (credit)
Cotter, William — Nolan, P. J. (credit)
Daly, D. J. — O'Connor, J. J.
Ennis, Miss D. M. — O'Driscoll, John
Fallon, G. A. — O'Hare, M. B.
Handcock, W. J. — O'Mahony, Jeremiah
Hurley, J. D. (credit) — O'Sullivan, D. C.
Hurley, T. J. — Ryan, M. A.
Johnston, J. B. — Taylor, B. O'C.
Kelleher, D. L. — Teevan, R. J. (credit)
Kelly, J. A.

Anatomy only

Corcoran, M. P. — Wallace, James
Keane, T. A. — Watkins, James
O'Neill, J. J. — White, J. E. C.

Third Examination

Hygiene only

Boyd, J. R. — O'Neill, T. J.
Daly, D. G. — O'Neill, W. J.
Eastwood, P. J. — Quirke, J. M.
Fleming, A. R. — Roche, J. V.
Huey, J. A. — Sheridan, J. J.
Kilroy, C. S. — Stack, P. D. J.
Nolan, J. J. — York, A. J.

Pathology only

Gordon, James — McManus, Dermot
Gray, R. F. — Magee, B. F.
Hally, W. P. — Noonan, J. D.
Henehan, M. D. — Rhatigan, P. J.
Jameson, J. G. — Tuite, Michael
McElroy, Robert — Walsh, M. C.
McInerney, J. F.

Final Examination

Cullen, R. G. — McClintock, S. J.
Dowling, J. P. — McDermott, Patrick
Flanagan, William — McGrath, M. J.
Hurley, M. C. — Mooney, F. M.
Kelly, E. J. — Walsh, M. C.
Kelly, Jeremiah — Walsh, P. D.

Liverpool

Final Examination

Illingworth, H. M.

PLAN TO IMPROVE AMERICAN HEREFORDS WITH BRITISH BLOOD

At the request of Mr. Wallace Johnson, of Up-right Ranch, Santa Cruz, California, who recently purchased the prizewinning bull Westhide Governor, Mr. Peter Fraser, of Westhide, Herefordshire, owner of the Westhide herd of pedigree Hereford cattle, is visiting America.

Mr. Johnson suggested that Mr. Fraser might advise him on a breeding programme to be prepared in consultation with the University of California to test the effect of English Hereford blood on the American Hereford cattle. Many breeders in America think the time has come to reintroduce English strains to try to improve the hybrid vigour of the American animal. In recent months several prominent English Hereford bulls, including the £16,000 Vern Diamond and royal champion Freetown Contrite, have been purchased by American breeders. These bulls and Westhide Governor will probably be used in the experiments. If the Americans become convinced that infusion of English Hereford blood is essential to the future of their stock big dollar deals will follow.

NOTES AND NEWS

Diary of Events

Jan. 13th.—Meeting of the R.A.V.C. Division of the B.V.A., at Langley Court, Beckenham, Kent.

Jan. 13th.—Meeting of the Editorial Committee, B.V.A., at 7, Mansfield Street, W.1, 2.30 p.m.

Jan. 14th.—Meeting of the South-Eastern Division, B.V.A., at Maidstone (Royal Star Hotel), 2.30 p.m.

Jan. 14th.—Meeting of the Western Counties Division, B.V.A. at Exeter (The Imperial Hotel), 2 p.m.

Jan. 14th.—Meeting of the Herts and Beds Division, B.V.A., at 70, Holywell Hill, St. Albans.

Jan. 14th.—Clinical Meeting of the West of Scotland Division, B.V.A., in the Glasgow University Veterinary School, 7.30 p.m.

Jan. 14th.—First Pharmaceutical Society Meeting to introduce The British Veterinary Codex (*see Notice*).

Jan. 16th.—Meeting of the Biochemical Society, in the Department of Chemical Pathology, Post-graduate Medical School of London, Ducane Road, W.12, 11 a.m.

Jan. 27th.—Meeting of the West of Scotland Division, B.V.A., in the Glasgow University Veterinary School, 2.30 p.m.

Jan. 27th.—Meeting of the Supplementary Veterinary Division, B.V.A., at the Wellcome Research Laboratories, Langley Court, Beckenham, Kent, 2 p.m.

Jan. 27th.—Second Pharmaceutical Society Meeting to introduce The British Veterinary Codex (*see Notice*).

Feb. 11th.—Royal (Dick) School of Veterinary Studies Annual Ball, in the Assembly Rooms, George Street, Edinburgh, 8.30 p.m. Proceeds to the Victoria Veterinary Benevolent Fund.

Feb. 26th.—University of Liverpool Veterinary Society Annual Ball, in the Students' Union, Bedford Street, Liverpool.

Mar. 25th.—V.V.B.F. Ladies' Guild: North of Scotland Division, B.V.A., Annual Dance, Aberdeen (*see Notice*).

Change of Date of Next Meetings of Council and Committees, B.V.A.

Owing to the fact that headquarters has moved to 7, Mansfield Street just before Christmas, the meetings fixed for early January have been postponed until Wednesday, Thursday and Friday, January 20th, 21st and 22nd, 1954.

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January Meetings of Council and Committees, B.V.A.

Wednesday, January 20th, 1954:—

10.0 a.m. Veterinary State Medicine Committee.
12.0 noon. Home Appointments Committee.
1.0 p.m. Interval for Lunch.
2.0 p.m. Organising Committee.
3.30 p.m. Parliamentary and Public Relations Committee.
At 7, Mansfield Street, Portland Place, London, W.1.

Thursday, January 21st, 1954:—

10.0 a.m. General Purposes and Finance Committee.
1.0 p.m. Interval for Lunch.
4.30 p.m. Official Opening of New B.V.A. Headquarters.
At 7, Mansfield Street, Portland Place, London, W.1.

Friday, January 22nd, 1954:—

11.0 a.m. Council Meeting.
At the Connaught Rooms, Great Queen Street, W.C.2.

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The New Year Honours

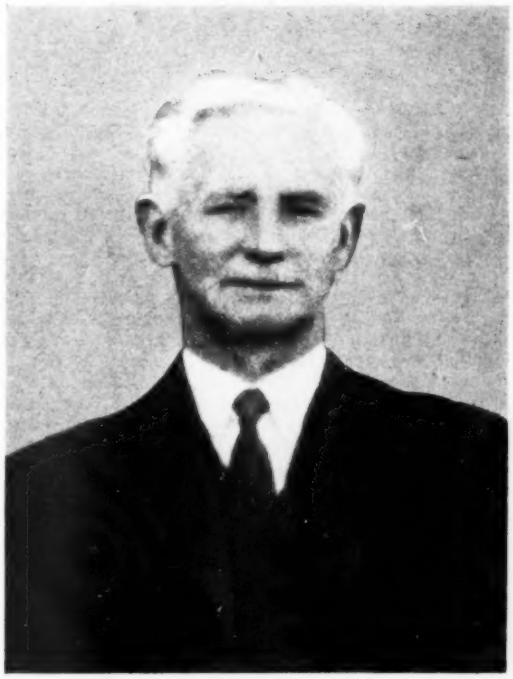
In the New Year Honours conferred by the Queen, announced on Friday last, we are glad to note the award of the C.M.G. in the Order of St. Michael and St. George to Mr. Ian Clunies-Ross, Honorary Associate of the Royal College of Veterinary Surgeons and Chairman of the Australian Scientific and Industrial Research Organisation, now stationed at the Animal Virus Diseases Research Institute, Pirbright. We also welcome the conferment of the C.B.E. in the Civil Division of the Order of the British Empire upon Mr. Harry Cronly, D.V.S.M., D.T.V.M. (EDIN.), Director of Veterinary Services and Animal Industry, Uganda, East Africa.

Death of Mr. William Brown, M.R.C.V.S.

Editor of "The Veterinary Record" 1920-54

Readers will learn, with very great regret, of the sudden and unexpected death on January 1st of Mr. William Brown, M.R.C.V.S., Editor of *The Veterinary Record*. He was at his desk on the day of his death, appearing to be in his usual health, but collapsed on his way home and died before reaching hospital.

Mr. Brown entered the service of the Association in 1920; he was not then a veterinary surgeon and was studying at the Royal Veterinary College for his diploma, which was awarded in December, 1922. He became assistant to the late Mr. G. H. Livesey at a time when the latter combined the functions of Honorary Secretary and Honorary Editor.



In his early days Mr. Brown combined the posts of Editorial Representative and Assistant Secretary. But as the Association grew in numbers and in prestige, the *Record* demanded the whole of his time. As a young man he had been a professional journalist and thus had the advantage of adding technical and typographical knowledge to his professional qualifications. For a number of years he retained the title of Editorial Representative, and it was in this capacity that the Association made an inscribed presentation to him in October, 1945, in grateful recognition of a quarter of a century's service. He assumed the title of Editor of the *Record* in the same year.

As our Editor he was judicious, knowledgeable and conscientious. Under his guidance the *Record* has steadily increased, both in circulation and prestige, and now reaches veterinarians all over the world. His early and untimely death at the age of 62 leaves a gap that it will be difficult to fill.

A Quaker by denomination William Brown was in himself of a reserved and dignified disposition. His personal modesty

was such that, after all his years of service, there are few documents to describe the important part he played in the life of the Association, and how substantially he contributed to its development by his particular qualities of wisdom and integrity.

To those who knew him well he was notable for a quiet geniality and an inexhaustible kindliness. By his colleagues he was held in the highest affection and regard, and his tragically sudden death has robbed both the veterinary and the journalistic professions of one who could ill be spared.

His funeral took place on January 7th at Golders Green Crematorium. He leaves a widow and one son.

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A Tribute from the General Secretary and Staff of the British Veterinary Association

It is a very great shock to be deprived so suddenly of the presence of someone with whom one has been in daily contact for almost 30 years. I personally am very conscious of the gap which the death of my colleague, William Brown, has left at B.V.A. headquarters, and he will be very greatly missed. I know I speak also for the rest of the staff when I say this, whether they have been here for years or only for a short time. We cannot realise that the man we said goodnight to on New Year's day died only 15 minutes later and will no longer come among us.

William Brown was always kind and gentle in his dealings but he allowed nothing to come in the way of producing *The Veterinary Record* week by week, month by month, year by year. Even on holiday he kept in touch, and wars and printers' strikes found him first thinking how to continue production. This was no easy task. Those who receive the journal each week perhaps do not always realise the amount of work involved in dealing with material received for publication; getting clinical articles approved, the editorial decided upon, abstracts ready on time, large advertisements fitted in and small ones collected, editorial meetings arranged and endless correspondence carried on.

This work William Brown performed faithfully for well over a quarter of a century and he must have made many friends in his profession during that time. None, however, can feel his loss more than I and, with the rest of the staff here, I want to say how sadly we shall miss our day-to-day talks and continuous consultations. William Brown will be hard to replace here. How much more must the loss be felt by his wife and son—to whom we extend our very deepest sympathy in these hard days.

F. K.

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PERSONAL

Birth.—Loftus.—On December 11th, 1953, to Evelyn, wife of Anthony Cole Loftus, M.R.C.V.S., a son—Richard Anthony.

Nicol.—On December 25th, at Jarvis Maternity Home, Guildford, to Margaret (*née* Hughes), wife of John Nicol, a daughter—Janet Ann.

Steven.—On January 3rd, 1954, at the Tonbridge Nursing Home, to Shirley, wife of Henry Steven, B.Sc., M.R.C.V.S., a daughter—a sister for Jennifer and Hazel.

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Forthcoming Marriage.—Tuckett—Good.—The engagement is announced between Paul Tuckett, M.R.C.V.S., of Town Mill, High Street, Amersham, Bucks, and Betty Good, of The Manor, Aston Sandford, Aylesbury, Bucks.

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Death.—Tutt.—On December 30th, as the result of an accident whilst hunting, Loetitia Ethel, widow of the late John Boon Tutt, F.R.C.V.S., of Winchester.

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Retirement of Captain William Watt.—The Glasgow Herald reports that, at their meeting on December 24th, Stirling County Council expressed their appreciation of the service rendered by Captain William Watt, M.R.C.V.S., D.V.S.M., Superintending Veterinary Officer of the Ministry of Agriculture and Fisheries. Captain Watt, who is due to retire on January 11th, will have completed 34 years with the Ministry.

R.C.V.S. OBITUARY

Allan, John, 14, Market Crescent, Castle Douglas, Kirkcudbright. Graduated Glasgow, December 20th, 1901. Died December 23rd, 1953; aged 83 years. Mr. Allan had practised in the Stewartry for over 30 years, retiring seven years ago.

Brown, William, M.R.C.V.S., "Wilscombe," Bannings Vale, Saltdean, Sussex. Graduated London, December 20th, 1922. Died January 1st, 1954; aged 62 years.

Spreull, Andrew, D.S.O., T.D., M.R.C.V.S., 359, Perth Road, Dundee, Angus. Graduated London, July 18th, 1902. Died December 31st, 1953; aged 76 years.

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Dr. F. C. Minett, C.I.E., M.B.E., D.Sc., M.R.C.V.S.

Personal Tributes

Dr. S. J. Edwards writes:—

With the death of Dr. F. C. Minett I mourn the passing of my one-time Director and colleague whose staff I was privileged to join in January, 1928. He it was who first instructed me, as he has done many others, in the ways of the bench and in the pursuit of research work. In the first, he possessed a craftsmanship which imposed a stern discipline but it was a pleasure to watch for his techniques were always precise and planned to a detail; in the second, it was his rule to begin by making himself thoroughly familiar with the literature and to assess its value always with a critical but unbiased mind. In the conduct of his work he seemed to prefer the more arduous and less spectacular path, but in the field of bovine mastitis especially, his logical approach and steadfastness of purpose have stood the test of time, and no serious criticism of his main findings has been advanced by the many workers who have followed him. His wide reading brought him an acquaintance with many workers in the allied fields of medicine and dairy science, and those with whom he had personal contact held him in the highest regard for the integrity of his work. His many publications on a variety of subjects bear the mark of careful and painstaking research described always with a clarity resulting from careful preparation and revision.

Though seemingly aloof and difficult to know, he showed great kindness, understanding, and even tolerance towards his colleagues, with whom he was always prepared to share his achievements or to afford them every recognition for their own endeavours. He preferred the retirement of his laboratory to the pursuit of political affairs but he felt it his duty at all times to help the profession by serving on scientific committees as well as by actively supporting various societies which he also encouraged his staff to join. He was not easily amused but possessed a very real sense of humour and relished a good joke or amusing situation with the greatest appreciation; when the day's work was done he could relax and become an excellent host or a pleasing guest, participating to the full in any form of enjoyment. Such was the character of the man who, though occupying high position both in this country and abroad, remained modest and approachable and, by his patient work and honesty of purpose, brought great credit to our profession.

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I should like to record a brief note of appreciation of my late friend and colleague, Francis Colin Minett. It was my very good fortune to be placed with him for some three or four months as a research student, fresh from college, when he showed me the greatest kindness and understanding that laid the foundation of a lasting and treasured friendship. During those years I came to know him well and to regard his work as among the very best in the field of bacteriology. Upholding always the best tradition of laboratory research he was a model of the methodical approach. Not only the days, but the weeks and months ahead were completely planned in his carefully considered programme so that I believe he could, if asked, have told at any time what he would be doing in 12 months hence. His records, also, were a model of orderliness that enabled him clearly and effectively to produce a most excellent report in what always seemed to be an incredibly short space of time. His interest was essentially in the work itself, an interest that never waned or gave place to that of the development of a department or an institute, but seemed only to grow. He followed the best tradition of laboratory research workers.

On first acquaintance one might not have suspected a genius for comradeship and an outstandingly keen sense of humour, but it was there all the time and it stood by him to the very end—I saw him only a few weeks before he died, much changed in appearance, but very ready with a smile to turn off any sadness with a touch of humour. There was kindness and thought for others there. It will convey some impression of his courage to recall the account he gave me of his deliberations as to how to dispose of a large crop of tobacco that he had been growing. It could not, of course, be sold, nor, as he had discovered, could it be given away without the recipient being liable to pay the appropriate duty. He had calculated that should the whole crop be turned into smoking tobacco some £200 or £300 would be payable and he had therefore concluded that the logical procedure would be to bequeath it to an enemy! I am sure he would have liked this to be recorded.

There was a great deal in our colleague to admire and much warm-hearted fellowship. E. L. T.

. . . .

Of Minett's scientific work others will tell; I would like to pay my tribute to him as my first director, during the years before the last war, as a personal friend of my wife and myself, and as one who was really understood and appreciated by too few people. To know him one had to be with him both in and out of the laboratory, to join in the cricket he organised between professional and technical staff on Parliament Hill Fields, and to share, after the match, the hospitality of his flat, his family and his dachshunds, or to spend a long week-end with him and a few close friends in Paris during the 1937 Exhibition. His kindness to young people knew no bounds; his apparent brusqueness was reserved for those who would take him from the laboratory bench where he liked above all else to be, or who failed to respect the high standard of scientific integrity which he set for himself and his staff.

In the last years of his life he seemed a lonely man, for fate had conspired to rob him of the comforts of family life that he might have enjoyed. But what an example of courage and fortitude he displayed to the end, never ceasing in his scientific labours, never bemoaning his fate, always keeping a smile and joke for his friends!

I owe him a great personal debt, for he encouraged me to take up pathology, accepted me on to his staff, helped me always and in every way and took a great interest in my work and my family. He was an example of singleness of purpose, scientific integrity, courage and dignity which I shall always remember. Although his published work will be no small memorial, yet I feel that the help and encouragement he gave to others and the example of courage and fortitude which he displayed to the last may well, if it comes to a final reckoning, be seen to be no less an achievement.

E. G. W.

. . . . .

Ben Emlyn Davies

An Appreciation

Mr. Oliver G. Jones writes:—

The recent passing of Ben Emlyn Davies will leave a gap in the ranks of the profession which it will be impossible ever to fill. Ben—and throughout the Midlands everyone knew him as Ben—was always a perfect gentleman in every way. He always thought more of other people's worries and troubles than of his own and gave himself entirely to his professional duties and the welfare of those around him. He was indeed a Welshman and with it had the mercurial personality that one might expect. He was never more kindly than when handling a sick or wounded animal, and his compassion for pain and suffering in his patients was unbounded and a lesson to all. Equally his reaction to cruelty in any shape or form was dramatic to witness and obviously quite uncontrollable.

Ben was a Colossus amongst men. He was a mixture of courtesy, charm, manners, ebullience, shyness, gentleness and kindness, but above all it must be said that he was generous, and indeed generous to a fault. So much so that he rarely prospered by his own endeavours, because he preferred to pass the benefits on to others around him. He will be sadly missed.

Veterinary Surgeons Act, 1948

Election of Members of the Council of the Royal College of Veterinary Surgeons

In accordance with the Veterinary Surgeons Act, 1948, five members of the said Council, who must be members of the said Royal College, will be elected in 1954 by members of the Royal College residing outside the Republic of Ireland.

Five present members of Council will retire at the Annual General Meeting in 1954 and are eligible for re-election, namely:—

J. F. D. Tutt, Esq.,
Professor J. W. Emslie,
H. Holroyd, Esq.,
J. D. Peele, Esq.,
Miss J. O. Joshua.

Nominations of persons for election to the Council must be submitted in writing on a form which may be obtained from the undersigned, and which must be returned to him duly completed before *January 31st*, 1954.

Each such nomination form must bear the signature of the proposer and seconder, who must not be present members of Council, and must be countersigned by the nominee.

W. G. R. Oates, *Registrar*,
Veterinary Surgeons Acts, 1881-1948,
9, Red Lion Square,
London, W.C.1.

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ADDRESSES OF DISEASE-INFECTED PREMISES

The list given below indicates, first, the county in which are situated the premises on which disease has been confirmed, followed by the postal address and date of outbreak.

Anthrax:

Ches.—New Russia Hall Farm, Tattenhall, Chester (Dec. 30).

Cumberland.—Skirwith Hall Farm, Penrith (Jan. 2).

Dunbarton.—Little Aiden Farm, Kilcreggan, Helensburgh (Dec. 31).

Hereford.—Rosemaud Experimental Husbandry Farm, Preston Wynne (Dec. 28).

Kent.—St. Stephens Nurseries, The Willows, Broad Oak Road, Canterbury (Dec. 30).

Lancs.—Rigg Farm, Goosnargh, Preston (Dec. 12).

Northants.—Council Farm, Addington Road, Irthlingborough, Wellingborough (Dec. 28).

Somerset.—Poplar Farm, Waywick, Hewish, Bristol (Dec. 29).

Surrey.—Pitt Farm, Frensham, Farnham (Dec. 28).

Sussex.—"Randolphs," Hurstpierpoint, Hassocks (Dec. 30).

Foot-and-Mouth Disease:

Glamorgan.—214, County Council Smallholding, Hensol Farm, Pontyclun (Dec. 26).

Fowl Pest:

Beds.—Watergate Farm, Hockliffe, Leighton Buzzard (Jan. 2).

Bucks.—Elmhurst Farm, Bierton, Aylesbury, Bucks; 45, St. Paul's Avenue, Slough (Jan. 2).

Cambs.—Willow Farm, Outwell, Wisbech (Dec. 31).

Devon.—21, Wilcombe Close, Tiverton (Dec. 31).

Dorset.—Manor Gardens, Cranborne, Wimborne (Dec. 30).

Essex.—Butchers Farm, Stapleford Abbot, Romford (Dec. 28); Garden Fields, Downham Road, Stock, Ingatestone; Wyldery Poultry Farm, Fox Street, Ardleigh, Colchester (Dec. 30); The Lodge, Kingsford, Colchester (Jan. 2).

Isle of Ely.—Holly Tree Farm, Leverington, Wisbech, Cambs (Jan. 2).

Leics.—2, Cottage Road, Wigston, Leicester (Dec. 31).

Lincs.—The Whitehorse Inn, Heckington; Oat Sheaf Inn, East Heckington; Mill Green, Spalding (Dec. 31).

Norfolk.—Corner Farm, Rocklands, Attleborough (Dec. 31).

Notts.—Dalite Poultry Farm, Breck Road, Walesby (Dec. 30); Sandhurst, Breck Road, Walesby, Newark (Dec. 31); 15, Ash Grove, Healdswood, Skegby, Mansfield; 49, Norman Street, Kimberley, Nottingham; Farley Lane Gardens, Hucknall, Notts (Jan. 2).

Sussex.—Orchard Farm, Blackboys, Uckfield (Jan. 3).

Yorks.—Mill Green, Spalding (Dec. 31).

SWINE FEVER:

Beds.—Bedford Road, Willington, Bedford (Dec. 29); Wilbury Hill Farm, Stotfold, Arlesey (Dec. 30); Grange Farm, Melchbourne, Beds (Jan. 2).

Bucks.—Joint Services College Pig Farm, Latimer, Chesham (Dec. 31).

Cambs.—Piggeries, Fulbourn Old Drift, Fulbourn (Dec. 29); Bank Farm, Fen Road, Waterbeach (Dec. 30).

Essex.—Rosemead, Bell House Road, Eastwood, Southend-on-Sea (Jan. 2).

Gloucs.—Downs Farm, Yorkley, Lydney (Dec. 30).

Herts.—Grange Farm, Shillington, Hitchin (Dec. 29).

Isle of Ely.—Jerusalem, Drove, Wardy Hill, Nr. Ely (Dec. 29); 2, Doddington Road, Chatteris (Dec. 31).

Lanarks.—Down Farm, Yorkley, Sydney, Glasgow (Dec. 30).

Lancs.—Highfield, New Hey Lane, Newton, Preston (Dec. 31).

Leics.—Englands Farm, Cross Road, Thurlaston (Dec. 29).

Lincs.—Kirkhill Farm, Gosberton, Westhorpe, Spalding (Dec. 29).

Norfolk.—Perry Lane Farm, Cawston, Norwich (Dec. 29); Church Farm, Banningham, Aylsham, Norwich (Dec. 31).

Salop.—Allscott Cottages, Worfield, Nr. Bridgnorth; The Buildings, Castle Fields, Shrewsbury (Dec. 30); Laburnam House, Pentre, Montfordbridge, Shrewsbury (Dec. 31).

Suffolk.—Cooks Farm, West Row Fen, Bury St. Edmunds (Dec. 31).

Surrey.—Willey Park Farm, Farnham (Jan. 2).

Sussex.—12, Pepperscombe Lane, and Pound House Field, Upper Beeding, Steyning (Jan. 2).

Worcs.—Meadow Farm, Catshill, Bromsgrove (Jan. 2).

Yorks.—Black Bull Inn, Skipton Road, Harrogate (Dec. 29); 2a, Cliff Villas, Balne Lane, Wakefield, Yorks (Jan. 2).

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The Tsetse Fly Diseases in Rhodesia

In the course of a contribution to the October 30th issue of *The New Rhodesia*, Mr. L. E. W. Bevan, M.R.C.V.S., formerly Director of Veterinary Research and Beit Research Worker in Trypanosomiasis in Southern Rhodesia, says that whereas in the "bad old days" 99 per cent. of their experiments ended in lamentable failure, the only good thing about them was that sometimes 1 per cent. proved a success. For example, in 1909, after innumerable failures, he found that certain salts of antimony were curative *vis-à-vis* the local trypanosome of cattle called *T. congolense*, and rendered recovered treated animals resistant to reinfection. "Of course, the drug had to be applied in a certain manner, or *secundum artem*, and the treated animal had to be given an adequate supply of food and water and of the essential salts of which tsetse-infested country is so often deficient. Also, the animal had to be appropriately treated for the many diseases with which trypanosomiasis is so often associated—anaemia, piroplasmosis, anaplasmosis, verminosis, avitaminosis, and the hundred and one complaints which constitute the last straw to break the bovine's back." Nevertheless, the treatment was adopted with success from the year 1909 to 1931—the year he left the Service. They rarely lost an infected animal, and they never had to destroy an animal, domestic or wild, as a means of controlling the tsetse fly disease. "It compared favourably with modern methods of which we read in the Official Reports for the year 1952, from which we learn that 'Trypanosomiasis (tsetse fly disease) caused the major veterinary problem of the past year in Southern Rhodesia' and that 'unprecedented numbers of cases were diagnosed in smears from three areas—Urungwe, Mkota and Sebungwe.' . . . Results of treatment do not appear to indicate that the present methods of controlling tsetse fly and the diseases transmitted by it are better than, if as good as, those adopted 40 years ago. And, be it noted, this in spite of the fact that during the whole of this long period the Entomological Department has been endeavouring by various fantastic devices, including the destruction of nearly half a million wild animals, and the wounding of as many more, to control the tsetse fly.

"The failure of the Veterinary and Entomological Departments of Southern Rhodesia to eliminate trypanosomiasis after so many years of strenuous effort is a matter of considerable importance at the present time in view of the recent decision to Federate with Northern Rhodesia, of which the greater part is infested by tsetse flies. It also gives rise to doubts concerning the formation of a great British Dominion of Central Africa which includes an area of 4,000,000 square miles infested or menaced by 20 species of tsetse flies. It is somewhat significant that the political protagonists of Federation did not breathe one word concerning the menace of the tsetse fly before the referendum. There are ways of dealing with trypanosomiasis other than those adopted in Southern Rhodesia, and some of these should be exploited if Federation and the development of Central Africa are to be a success.

"It would appear to be a hopeless proposition to attempt to 'swat' the tsetse fly—or, rather, 20 species of tsetse fly—in so vast an area, but, in the past, Government funds have been devoted almost entirely to this futile policy. Very little has been spent upon the study of the disease itself, its cure or immunity against it.

"Before an alternative can be found to this disgraceful 'slaughter policy,' a great deal of intensive research is necessary in the laboratory and in the field. Some original work was carried out in this direction by the writer as Beit Research Worker in 1934-1938, but his appointment came to an end at the commencement of the last Great War, and the work was abandoned. As far as is known, it has not since been resumed. Which is to be regretted, because considerable progress in chemotherapy had been accomplished which might have proved of practical value. On his return to Southern Rhodesia in 1936 no appointment nor accommodation could be obtained by him—he had not the wherewithal to finance the work, and his previous efforts were wasted. In view of the appalling mortality which has since occurred and the serious menace which the 'fly' and its diseases presents to Federation and the development of Central Africa, the neglect of intensive research is unfortunate. . . . In spite of the work of Bruce, little or no scientific research in this all-important subject was carried out in Southern Rhodesia until 1905, when the writer, as a District Veterinary Officer, endeavoured to identify the local trypanosomes and to devise a method of treating them. He found rabbits very refractory to infection with the small-animal trypanosome wrongly called *T. congolense*, but eventually he succeeded by the repeated inoculation of the same animal with the same species or strain of trypanosome which, on the principle that 'constant dripping wears away a stone,' eventually overcame its resistance. Thereafter the infection of rabbits with that strain was easy, and the action of drugs upon it could be ascertained.

"This observation has played a very important part in my researches during the past 40 years, because I have found that by this device one can establish certain species and strains of trypanosomes which after a time become 'fixed' in their behaviour and in their drug affinities. . . . This 'drug affinity' of trypanosomes is very remarkable. As Beit Research Worker in Trypanosomiasis, I collected three strains of the so-called *T. congolense*. They were morphologically identical, but each had its own 'drug affinity.' A drug would cure A trypanosome but not B or C strains; or B drug would cure B strain but not A and C. Perhaps that is what is happening at Urungwe where they had such poor results with dimidium bromide.

"No doubt the magicians of modern organic chemistry will soon produce a drug which will convey protection against all forms of trypanosomiasis," concludes Mr. Bevan. "It is only a matter of intensive research. Such a method of conveying protection by chemotherapeutic means was the main object of my work for over

40 years. It is a matter of deep regret to me that it came to such an untimely end just when it was nearing success. Such a method would be a great improvement upon existing techniques, which are proving so disastrous."

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COMMONWEALTH AGRICULTURAL BUREAUX

Work in 1952-53

The 24th annual report of the Commonwealth Agricultural Bureaux, issued by the Executive Council in October, 1953 (H.M.S.O., 3s. 6d.), described the work carried out at the three institutes and 10 bureaux during the year 1952-53.

The report gave many examples showing how the use of these organisations by both Commonwealth and other countries had steadily increased year by year. Income from publications had nearly doubled since 1946-47 and the number of subscriptions to the various periodicals had risen to 12,365, of which 7,062 were from countries outside the Commonwealth.

The Institutes

The Commonwealth Institute of Entomology reported a new development in connection with the World Reporting Service of the United Nations Food and Agriculture Organisation (FAO). By arrangement with the Colonial Office of the United Kingdom, this institute was to collate information on the outbreak of insect pests to be sent in by the U.K. dependent territories and to transmit it to FAO for publication in that organisation's *Plant Protection Bulletin*. Thus the institute was assured of the most up-to-date information on the status of insect pests in those territories and its general information service was strengthened.

The Commonwealth Mycological Institute reported one of the most difficult years in its experience. Financial stringency had been so severe and so prolonged that its effects would be felt for some time to come. The institute's culture collection had increased during the year. A notable addition to the equipment of the herbarium was the installation of the disinfestation chamber for the control of insect damage to specimens. The herbarium had also received a notable gift of collections and slides from Dr. J. Ehrlich, of the United States.

The Commonwealth Institute of Biological Control, with headquarters in Ottawa, Canada, reported a number of developments during the year.

The Bureaux

Typical examples of the work of the bureaux during the year are as follows:—

Agricultural Parasitology.—Facilities for the study of literature on this subject were afforded to scientists from Lucknow University (India), McGill University (Canada) and the Public Health Department of St. Albans (England). Correspondents were supplied with information on such subjects as hookworm in dogs, kidney-worm in swine, and control of lungworm in cattle.

Animal Breeding and Genetics.—Help was given on growth curves in beef cattle (Canada), progeny testing of dairy bulls (India and Pakistan), heat tolerance in poultry (Sudan), age of cattle at puberty (Scotland), and sheep-breeding (German Federal Republic).

Animal Health.—Enquiries dealt with included those on freeze-drying of biological products for storage; pollution of pastures by factory effluents; and cattle diseases, caused by chemicals contained in modern lubricating oils and insecticides, occurring in the German Federal Republic.

Animal Nutrition.—Among the subjects of enquiries answered were: pig feeding (Spain); the value as feeding-stuffs of safflower seed oil meal (German Federal Republic) and whale products (Argentina and Tasmania); the use of antibiotics (Israel).

Dairy Science.—Much greater use was made of this institute during the year. Subjects on which information was requested included preserving liquid milk under tropical conditions (Nigeria); storing milk (Northern Rhodesia and France); the influence of seasons on production and composition of milk (Southern Rhodesia); variations in composition of milk during the milking process (New Zealand) and the use of vegetable oils in margarine manufacture (Canada and the United States).

Forestry.—The technique of pollen analysis, forestry of the Solomon Islands, bamboo canes for fishing rods, tree surgery and bamboo as fodder for horses and cattle were among the subjects of enquiries answered.

Horticulture and Plantation Crops.—An increased number of enquiries and increased size of the *Horticultural Abstracts* were reported.

Pastures and Field Crops.—Help was given to scientists in various countries in building up collections of crop varieties (seeds) needed for specific purposes. More major enquiries were answered than last year.

Plant Breeding and Genetics.—Enquiries from the United Kingdom, India, Southern Rhodesia, Uganda and Kenya, were answered.

Soil Science.—Subjects of enquiry answered included: problems of soil chemistry (United Kingdom, Ceylon, India and the United States); administration of soil conservation (Sierra Leone); methods of assessing soil fertility (India); nitrogen fixation in the tropics (Nigeria); soil classification (Trinidad); fertilising the vine (Canada); and effects of fertilisers on vitamin and mineral content of food plants (U.K.).

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FINCH PLAGUE IN AFRICA

Threat to Grain Crops

A correspondent informs readers of *The Times* in a recent issue that a bird plague, comparable with the great locust invasions, is threatening Africa's grain crops from the Sudan to the Orange Free State. It comes in the form of dense swarms of queleas (*Quelea quelea lathami*) or red-billed finches. The growth of these swarms from thousands to millions of birds has been caused by man-made changes—dams and fields of wheat, sorghums and millet—in their African environment.

"The scale of the invasion has caught most Governments in Africa unprepared, and hasty 'blood-and-thunder' methods of fighting the plague are being used.

"In Northern Tanganyika, attacks on quelea swarms with explosives and poison have not been sufficiently effective to save the wheat crops. Kenya may soon ask the chemical warfare section of the British War Office for poison gas specialists to combat the expected invasions of croplands. Last year a comparatively small invasion into Kenya caused £750,000 worth of damage. The birds have now spread into Nyasaland and Matabeleland.

"In the Sudan queleas have become a major problem. There they are even accused of extending the Sahara by annually wiping out the grass-seeds on the desert fringes without which new grasses cannot spring up to replace the old. In Northern and Southern Rhodesia damage to kaffircorn by queleas has become an ever-present problem. In South Africa, with its greater concentration of vulnerable crops, the prospect of mass invasion by these birds has become alarming.

"Dr. T. J. Naude, Director of the Union Government's Division of Entomology, who is leader of the South African three-man research team against the queleas, estimates that a good-sized swarm may number 3,500,000, and that each bird is capable of eating ½ oz. of grain a day.

"The quelea invasion into the Union may eventually make kaffircorn-growing extremely difficult, and thus rob South Africa's drier areas of their safest crop. Queleas threaten the main wheat growing areas in the Free State and the Transvaal, and threaten to destroy the veld barrier to South Africa's advancing deserts . . .

"The quelea invasion recalls the forecast made a few years ago by Dr. P. B. Uvarov, the Russian-born entomologist, that new plagues were sure to rise in Africa. He pointed out that until civilised man began growing his crops on a vast scale in America, grasshoppers did little damage. Then the additional food and shelter provided by these crops gave the grasshoppers a chance to multiply on an unprecedented scale. Similar problems, Dr. Uvarov predicted, were bound to follow the large-scale opening of agriculture in Africa."

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POWER LINES CUT BY OWL

An owl, which had apparently alighted on an oil switch at an electricity sub-station, caused a breakdown in supplies affecting much of Gloucestershire and part of Monmouthshire one night recently. Lights went out for about 40 minutes. The bird's wing-span was so great that when it spread its wings it earthed one of the phases, sending 33,000 volts through itself and creating a major fault. Its body was found below the equipment.

CORRESPONDENCE

The views expressed in letters addressed to the Editor represent the personal opinions of the writer only and their publication does not imply endorsement by the B.V.A.

The indulgence of members is asked for any slight delay in dealing with communications addressed to this journal which may arise as a result of the untimely death of the Editor.

MEAT INSPECTION SERVICES

Sir,—As one of Professor von Ostertag's last disciples who still had the privilege of hearing this eminent teacher and founder of modern Meat Hygiene, I cannot omit to congratulate the organisers and speakers of the Aberdeen, 1953, B.V.A. Congress for giving this subject such a prominent place and also on their choice of the President-Elect.

The pros and cons of meat inspection coming under the supervision of the veterinary profession have been amply ventilated not for " the past score years or more " (*Vet. Rec.* No. 43, October 24th, 1953, p. 690) but for over half a century, and not only in " this country " but all over the world. The outcome of these discussions (not " ill-conceived attacks ") mainly between the most prominent representatives of the medical and veterinary professions can best be summarised, I think, by quoting the " Regulations Governing the Meat Inspection Service of the United States," which specifies: " All stations where slaughtering is conducted shall have veterinary meat inspectors in charge . . . who must be graduates of veterinary colleges accredited by the United States Civil Service Commission," or to cite the German " Fleischbeschaugesetz " (Meat Inspection Law) of 1940: " Als Beschauer sind Tierarzte zu bestellen." (The posts of meat inspectors have to be filled by veterinary surgeons.)

Having taught Meat Hygiene for almost a quarter of a century not only to veterinary students but to medical graduates, sanitary inspectors and butcher apprentices as well, I must assure Mr. McPherson that the approach of each of these groups is quite different. The heaviest demand is made upon the veterinary student who in his final year is well prepared to accept the full impact of modern Meat Hygiene, a subject now entirely different from that of the days when a sharp knife and keen eye alone decided upon the merits of a carcase. To-day Meat Hygiene covers a wide field and plays an important part in public health, in the eradication of animal diseases and zoonoses. It is no longer an abstract subject but is based on veterinary anatomy, parasitology, physiology, hygiene, bacteriology and pathology. Its teaching and research go a long way towards the improvement of methods of meat production and processing, abattoir and meat plant construction, and, last but not least, render valuable assistance to the meat trade. It occupies a large part of the veterinarian's curriculum or the post-graduate's study for the diploma in Veterinary State Medicine. The importance of this subject is perhaps most clearly emphasised on the Continent, where independent Chairs have been created and the teacher not only admitted to the Senatus Academicus but even sharing the high distinction of becoming Rector Magnificus of some of the oldest universities.

I can assure Mr. McPherson that it is not the veterinarian's desire " to search out new hunting grounds." The old ones have still ample game and there is no indication of any decrease for a number of years to come. But we are determined to raise the standard of Meat Hygiene to the required level of to-day's public health demands in every civilised country all over the free world. However, as an old lecturer, M.R.San.I., and a very proud meat inspector who has spent 23 years not only " in abattoir offices " but " white-coated " in slaughter halls and abattoir laboratories inspecting many thousands of carcases; as one who is not only " dictating the do's and don'ts of meat pathology to the already well-practised " but who is also sharing the " arduous hours and the hard, exacting task " of meat inspection with his non-veterinary meat inspectors, of whom many are his personal friends, I should like to call upon Mr. McPherson and ask him to bury the hatchet. He and I in mutual harmony could do much to improve the standard of Meat Hygiene for the benefit of the human race.—Yours faithfully, A. Ginsberg, P.O. Athi River, Kenya. *December 17th*, 1953.

HYPERKERATOSIS IN CATTLE

Sir,—On April 4th, 1945, in consultation with Mr. W. Kendrick, M.R.C.V.S., of Tarvin, I saw a most unusual condition in a yearling pedigree Ayrshire bull in an " attested " herd in Cheshire.

The bull was housed in a wooden box which recently had been dressed, both inside and out, with a creosote wood preservative. The animal was brought to the farm a few weeks previously and placed in the aforementioned box. Here it soon developed a skin eruption in the intermaxillary space. Thence the lesions quickly extended all over the body, affecting both brown and white parts of the coat, and even the scrotum was involved. The lesions appeared first as discrete, heaped up and wrinkled layers of exfoliating epidermis. Later the whole dermis appeared necrotic and leather-like but showed no tendency to slough away.

Systemically the bull was severely ill. It showed profound depression, lachrymation, nasal discharge and diarrhoea. The pulse was weak and rapid and the temperature subnormal. A blood examination showed a total leucocyte count of 11,000 per $mm.^3$ and the percentages of white cells were respectively segmented neutrophiles 2, unsegmented neutrophiles 42, lymphocytes 56 and eosinophiles 0. Examinations for ectoparasites were negative.

A diagnosis was not made and next day the animal was destroyed. The gastro-intestinal tract was congested throughout and much of the epithelium of the colon had been lost. The most prominent lesions, however, were numerous ulcers, the size of a penny, in the abomasum.

I had little doubt after reading the American literature in recent years that this bull was affected with X disease or hyperkeratosis, and Mr. Loosmore's description of that disease in your issue of December 19th confirms me in this belief.—Yours faithfully, G. H. Arthur, Royal Veterinary College Field Station, Streatley House, Streatley, Berks. *December 21st*, 1953.

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R.A.V.C. WAR DOG TRAINING SCHOOL

An Appeal for Alsatians

Sir,—The R.A.V.C. War Dog Training School, Melton Mowbray, has a constant need of young Alsatian dogs for training as war dogs for the Army.

It has occurred to us that veterinary surgeons may often be asked to destroy or find a home for the type of dog required by the R.A.V.C.

The types required are young (one and a half to three years) male Alsatians, weighing at least 65 lb. By nature they must be courageous, ready to stand up for themselves and quick to anger. Dogs of this temperament are frequently too much for their owners, but in the Army they would receive good training and good treatment, and they would be most usefully employed in guarding public property. We should be glad to arrange for the purchase of such animals or to accept them as gifts.—Yours faithfully, J. Clabby, Commandant, R.A.V.C. Training Centre and Depot, Melton Mowbray, Leicestershire. Tel. No.: Melton Mowbray 503. *December 28th*, 1953.

DISEASES OF ANIMALS ACT, 1950—GREAT BRITAIN

Summary of Returns of Confirmed Outbreaks of Scheduled (Notifiable) Diseases

Period	Anthrax	Foot-and-mouth	Fowl Pest	Sheep Scab	Swine Fever
1st to 15th December, 1953 ...	20	4	64	—	75
Corresponding period in—1952	86	—	173	—	40
1951	20	28	32	3	45
1950	13	—	13	2	46
1st January to 15th December, 1953	589	39	926	—	2,653
Corresponding period in—1952	1,137	495	403	1	828
1951	387	98	816	11	1,302
1950	331	20	133	26	376